

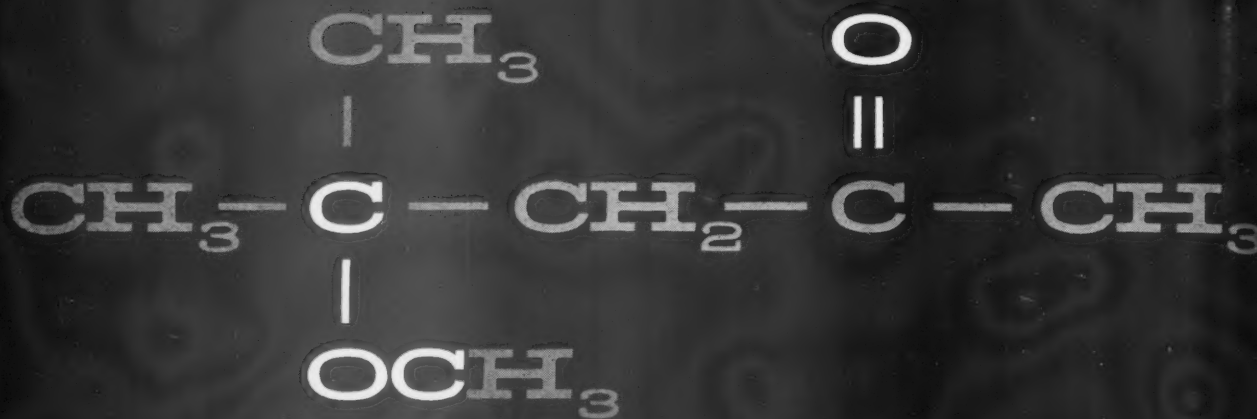
SEPTEMBER 1961

PVP

PAINT and VARNISH
PRODUCTION



DeSoto's Sam Greenberg, shown checking a resin reactor chart, creates new markets by urging employees to ask the question: "What does the customer need that he doesn't even know he wants?" See p. 79.



Unique keto-ether structure of Shell Chemical's new Pent-Oxone high boiling solvent. COC of ethers and double bond O of ketones unite in this single Pent-Oxone solvent molecule to give you double solvent action.

VINYL SOLVENT:

Vinyl lacquers made with Shell

Chemical's new Pent-Oxone* high boiling solvent
cost less and smell better

Pent-Oxone solvent costs 17.5¢ per pound delivered in tank cars. It is mildly camphor-like in odor. It is a good solvent for vinyl resins and displays a high tolerance for hydrocarbon diluents.

Read how this remarkable Shell Chemical keto-ether compares with other high boiling vinyl solvents in evaporation and solution viscosity. And where to send for newly issued Pent-Oxone solvent technical bulletins.

PENT-OXONE is the only commercially available solvent which gives you both ketone and ether functional groups in a single molecule.

It is a true high boiler with an even evaporation rate midway between the evaporation rates of EGMEE acetate and cyclohexanone.

Low cost, high dilution, excellent solvent

Three qualities of this unique Shell solvent contribute to its lowering your costs on vinyl lacquers:

First, Pent-Oxone solvent has a comparatively low cost of 17.5¢ per pound, or \$1.325 per gallon, delivered in tank cars.

Second, Pent-Oxone can tolerate any amount of aromatic diluent within the practical formulating range in vinyl chlo-

ride/vinyl acetate copolymer solutions.

Third, Pent-Oxone is an excellent high boiling solvent for vinyl resins.

In addition, Pent-Oxone solvent's mildly camphor-like odor is more agreeable than the odors of other high boiling vinyl resin solvents.

High boiler comparison

As you might expect, Pent-Oxone's remarkable keto-ether structure gives it excellent solvent properties.

Here are viscosity comparisons with cyclohexanone on three week-old Vinylite** resin solutions:

15%	Pent-Oxone/MEK	43 cps.
VYHH	cyclohexanone/MEK	44 cps.
15%	Pent-Oxone/MEK	44 cps.
VMCH	cyclohexanone/MEK	46 cps.
15%	Pent-Oxone/MEK	62 cps.
VAGH	cyclohexanone/MEK	55 cps.

Both solvents were mixed 50/50 with Shell's MEK to reflect more accurately finished formulations, then diluted 50/50 with toluene.

New technical bulletins

New technical bulletins are now available from Shell on a variety of Pent-Oxone solvent applications.

One deals with Pent-Oxone solvent in vinyl lacquers. Another deals with Pent-Oxone and its twin, Pent-Oxol* glycol ether, in acrylic formulations. A third gives property data on both these solvents.

For copies of these bulletins, plus samples, contact any of Shell's nine Industrial Chemicals Division offices, or write Shell Chemical directly at 110 West 51 Street, New York 20, New York.

*Trade mark, Shell Chemical Company
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Chemical
Company



Industrial Chemicals Division

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Total solids content is constant in GEN-FLO®

GEN-FLO®

is produced to provide
a balance of:

- Freeze-thaw stability
- Scrubability
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- Mechanical stability

Creating Progress Through Chemistry

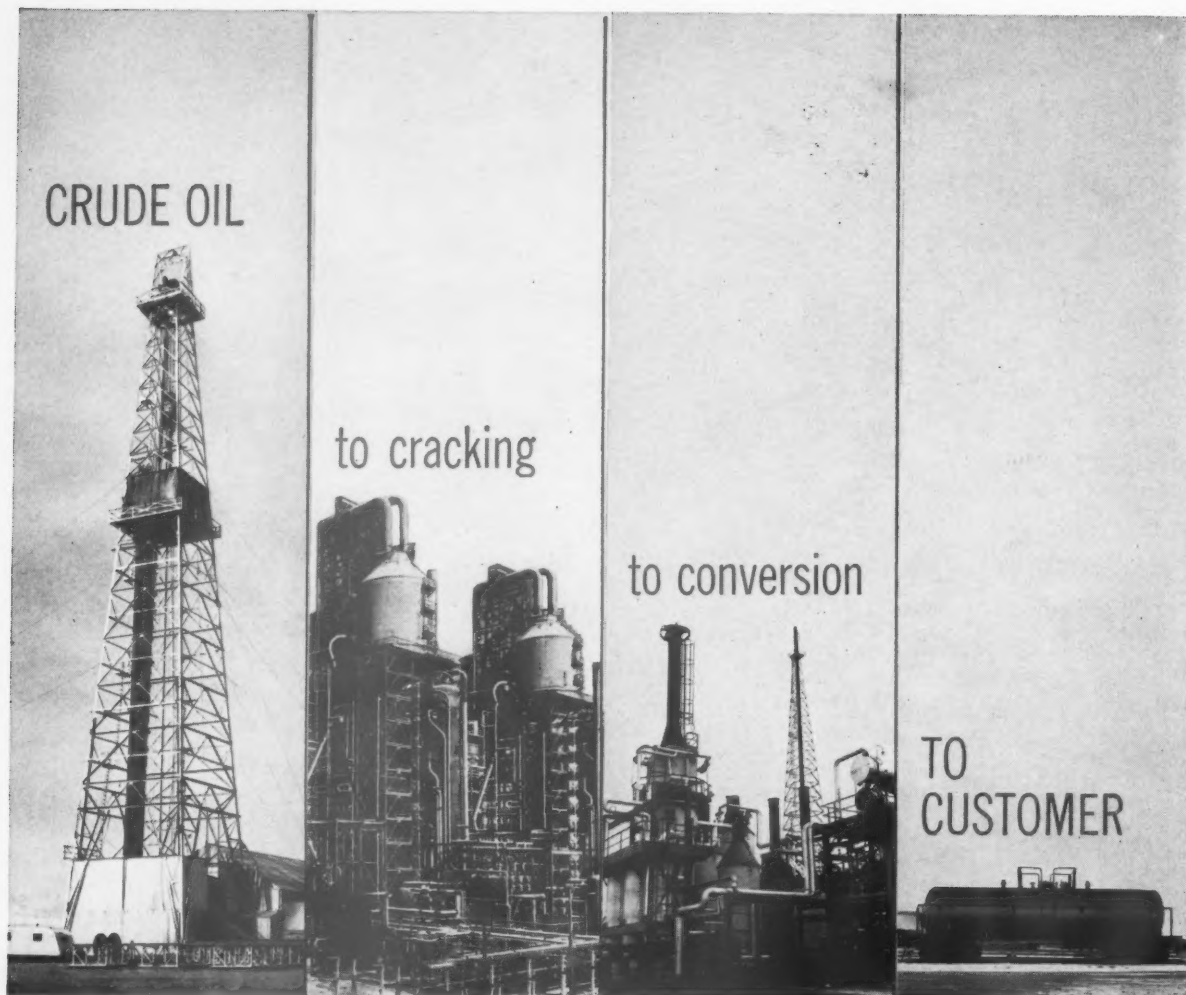


This carefully controlled total solids content in Gen-Flo is of prime importance in assuring uniform and consistent quality in your paint products. This and every one of Gen-Flo's outstanding qualities is tested time and again during its manufacture by skilled technicians to assure its consistent top quality. Let Gen-Flo help you improve your line . . . send for complete information on lab-tested, field-proven Gen-Flo styrene-butadiene latex today!

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Specific Gravity (20/20°C) max.....	0.793
Acidity, (as acetic acid—wt per cent) max..	0.002
Color (Pt-Co) max.....	5
Water (wt per cent) max.....	0.5
Non-volatile Matter (mg/100 ml) max.....	1
Distillation (°C)	
Initial min.....	55.5
Dry Point max.....	56.5
Permanganate Test (hrs) min.....	2
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Title (REG. U.S. PATENT OFFICE)

SEPTEMBER
1961

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOLUME 51
NO. 10

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OFFICES, 855 AVE. OF THE AMERICAS, NEW YORK 1, N. Y. BRyant 9-0497

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NEXT ISSUE

Imparting thixotropy to paint vehicles by means of low temperature incorporation of polyamide resins will be featured in our October issue.

PAINT and VARNISH PRODUCTION is published monthly except semi-monthly in March at Easton, Pa., by Powell Magazines, Inc., John Powell, president; Ira P. MacNair, vice-president and treasurer; Alan P. Danforth, vice-president; Alice L. Lynch, secretary. Entered as second class matter at Post Office at Easton, Pa., Jan. 30th, 1952, under the Act of March 3, 1879. SUBSCRIPTION RATES POSTPAID: *United States and Canada*, 1 year \$4.00; 2 years \$7.00. *Mexico and Pan-American Countries*, 1 year \$5.00; 2 years \$8.00. All other countries, 1 year \$8.00; 2 years \$15.00. Remit cash in advance, with order, by bankers draft on New York funds. SINGLE COPIES: *Current issue*: \$0.50; *all back numbers*: \$1.00. Convention issue: \$1.00. Review and Buyers' Guide: \$5.00. Bound volumes: \$15.00 per vol. when available. We cannot guarantee to supply back numbers and claims for missing numbers cannot be granted if received more than 60 days after date of mailing. Subscribers should promptly notify circulation department of any change in address, giving both old and new addresses and by sending address label. EDITORIAL AND EXECUTIVE OFFICES: 855 Avenue of the Americas, New York 1, N. Y. BRyant 9-0497. Printed in U. S. A.
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EDITORIAL COMMENT

Traffic Paints

SOME two months ago, President Kennedy signed the multibillion-dollar highway financing bill to complete the 41,000-mile interstate highway system by 1972. The bill permits additional Federal grants of 11.5 billion dollars to the states for construction and will provide additional Federal donations to states willing to comply by 1963 with Federal standards for curbing bill board blight along the new highway system.

The Better Highways Information Foundation estimates that the new interstate system will initially require 3,500,000 gallons of paint and 21,000,000 pound of glass beads. It is interesting to note that the over-all traffic painting program requires some 7,000,000 gallons of paint each year.

Within recent years, the practice of edgelineing has had a tremendous effect in reducing traffic accidents, particularly during heavy storms at night. For example in Ohio, the placing of edge lines on test sections of two-lane rural roads reduced accidents by 19 percent and deaths by 37 percent. Kansas proudly points to a dramatic reduction of accidents by some 21 percent and fatalities by some 59.4 percent because of edgelineing.

Thirty-seven states have edgelineing as an established policy. Six more are just entering the field with New York State being the latest entry. North Carolina leads with over 16,000 miles of highway so marked, and an additional 8,000 miles is scheduled for 1961.

It is estimated that the edgelineing of a two-lane

road means an additional 34 gallons of paint per mile. For the paint industry the practice of edgelineing represents a market worth shooting for.

Another trend which is creating quite a bit of interest is painting pavements with bright bands of color to make the roads safer both for motorists and pedestrians. For the motorists, bright bands of red and yellow warn him that he is approaching an intersection. For pedestrians, crosswalks in heavy traffic areas painted green with white-edged stripes helps to reduce accidents caused by jaywalking.

With the step-up in highway construction, suppliers of traffic paints will be expected to meet new state specifications for maintaining quality and durability.

In the interest of keeping you abreast of the most recent developments in traffic paints, we are pleased to publish in this issue a series of articles (page 47) covering traffic paint formulations, testing, specifications and modern mechanized striping methods.

Lot of Paint

WITH public auction of its paint manufacturing equipment at Mare Island Naval Shipyard in San Francisco last month, the Navy bowed out of the paint business—a most welcomed event for United States paint producers.

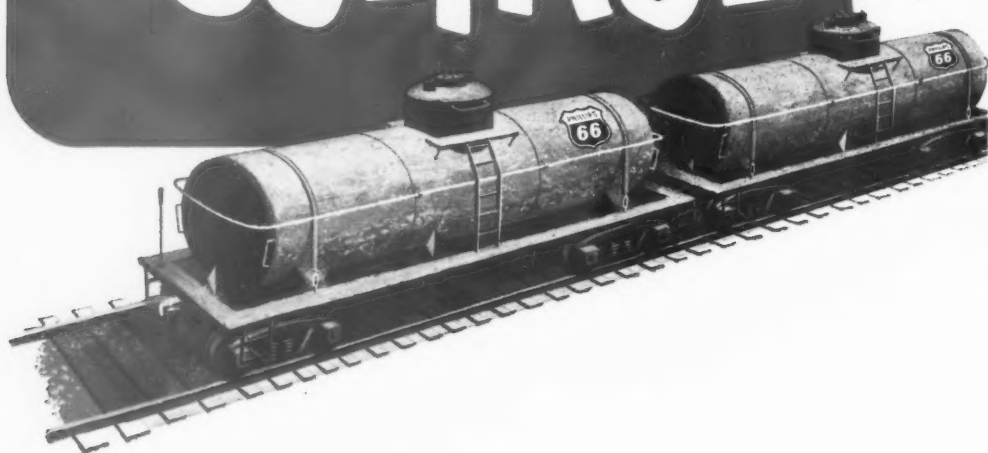
This plant had a daily capacity of 40,000 gallons and the Navy claims that all the paint produced in one year would paint a strip one foot wide forty-six times around the equator.

That's a lot of paint!



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Published monthly by
POWELL MAGAZINES, INC.
 855 Ave. of the Americas
 New York 1, N. Y.
 BRyant 9-0497

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New York
 Powell Magazines Inc., 855 Ave. of the Americas, New York 1, N. Y.
 BRyant 9-0497

Chicago
 R. D. Henriquez & Associates,
 549 W. Washington St., Chicago 6,
 Ill. Central 6-1626.

West Coast
 San Francisco: Morton McDonald,
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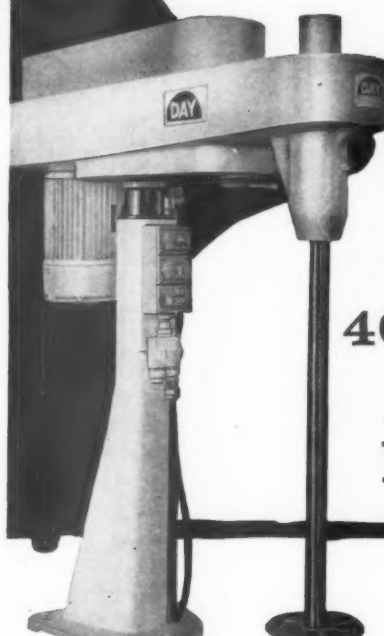
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MEMBER BUSINESS



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* YOU CAN HAVE DAYSOLVER PERFORMANCE LIKE THIS:

SPRAY-APPLIED WOOD FINISHES — 20 minutes, plus one pass on roll mill, to obtain a seven grind. Previous mixing time was 45 minutes, plus two roll mill passes.

SILK SCREEN PAINT — resin and vinyl chips cut in 40% less time than normally required.

HEAVY OFFSET BLACK INK — mixing time cut from 1 hour to 20 minutes, and two roll mill passes eliminated.

TESTS by technicians in many plants show the Daysolver Turbopeller design gives faster, better results for dispersing, mixing, dissolving, emulsifying, deagglomerating.



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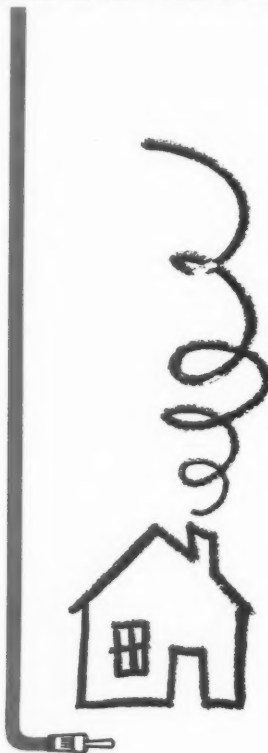
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LOW MOISTURE VAPOR TRANSMISSION



WHY IS LOW MVT IMPORTANT IN EXTERIOR LATEX PAINTS?

Your exterior latex paints will look better longer and give greater substrate protection with Lytron 680's low moisture vapor transmission. This acrylic interpolymer has a lower MVT level than any competing latex tested, yet allows *adequate breathing to prevent blistering*.

Lytron 680®—based paints give superior protection to wood and masonry surfaces by preventing damaging moisture from reaching the substrate. Low MVT means better adhesion because moisture is less likely to destroy the bond between the tight paint film and substrate—better appearance because of increased resistance to mildew, efflorescence and industrial gas staining.

Today, Lytron 680-based exterior latex paints are

being marketed by many leading manufacturers. Share in the booming exterior latex market—ask your Monsanto representative to demonstrate for you the special features Lytron 680 adds to exterior latex paints because of low MVT. Monsanto Chemical Company, Plastics Division, Springfield 2, Mass.

MONSANTO ACTIVATOR IN PLASTICS

THESE TEST RESULTS SHOW THE LOW MVT
LEVEL OF LYTRON 680.

	Clear Film	Specific MVT* 40% Pigment Volume Conc. Paint Film
A. Lytron 680	6.1	6.2
B. Acrylic Latex A	46.0	32.5
C. Acrylic Latex B	31.8	18.7
D. PVAC Copolymer A	43.0	75.0



*Specific MVT—Grams of water vapor passing through 100 square inches of film, 0.004 inches thick, per 24 hours. These data were obtained following the procedures of ASTM E-96-53T—Procedure E.



MANAGEMENT NEWSLETTER

A MONTHLY REPORT FOR MANAGEMENT OF THE COATINGS INDUSTRY

SEPTEMBER, 1961

ALTHOUGH THE ECONOMY made inch-by-inch gains during the first half most observers believe that the stage is set for striking strides forward during the last quarter. A rousing, record-breaking Christmas season is expected (barring major war or other catastrophe), but the competition for the consumer's dollar will be tough and bruising. There's confidence now that Gross National Product (GNP), the sum total of all goods and services produced by everyone at work, will pass the \$520 billion a year mark by year-end. Personal income, which usually is about \$100 billion less than GNP, went to the \$422 billion a year mark in July. Despite continued, pestering unemployment, several factors make the last quarter outlook extremely bright: First, consumers are more liquid. They have more funds in cash, banks, or other places, and are in a better shape, creditwise. Second, war talk promotes spending. People have a tendency not to put off major jobs, such as painting the house, or having it done, if they have the money and there is a slight possibility they may have trouble getting it promptly later. Third, everyone expects a slightly higher price level, although confident that inflation won't "run away." This tends also to make people want to buy now, rather than to wait. Fourth, business has become more confident that the New Frontier is not as "radical" as some had charged. President John F. Kennedy, in fact, seems to have adopted FDR's now-famous tactics when World War II appeared. FDR shelved "Dr. New Deal" for "Dr. Win-The-War." Reliable opinion is that as long as the Berlin crisis stays at white-heat and Soviet Russia continues to apply pressure in other areas, the President will concentrate on getting business support, rather than fighting big business. All factors considered, the last quarter may be the time to put the sales steam on and really move your products.

SMALL COMPANIES which properly utilize today's readily available economic and market data can develop profitable long-range plans and forecasts as guides to future operations in meeting predetermined goals, according to Forecasting In Small Business Planning, a Management Research Summary released by the U. S. Small Business Administration and available free at all SBA field offices. The research on which the summary was based is contained in a full report which may be obtained for \$1.50 from the School of Business Administration, University of Minnesota, Minneapolis 14, Minn. Specialists studied 106 small manufacturers in Minnesota and concluded that long-range planning and forecasting is fast becoming an indispensable element in the successful operation of small factories under present changing economic patterns. Basic steps in long-range planning listed should include a clear-cut picture of the company's goals; what business, economic and social conditions are apt to prevail during the planning period, and what programs, policies and actions the firm best can take to meet its aims. The summary includes discussions on typical approaches to forecasting and methods used by large companies, as well as



MANAGEMENT NEWSLETTER

factors influencing forecasts and sources of economic and market data readily available to small businesses.

A HIGHLIGHT of the National Paint, Varnish and Lacquer Assn.'s 74th Annual Meeting in Washington, October 30 through November 1 will be the Traffic Forum on October 31. J. J. A. Winzenried of Devoe & Reynolds Co., Inc., will preside. Other speakers include H. J. Dignan of the Glidden Co. and H. B. Reaves, Jr., of Pittsburgh Plate Glass Co.

TWO TRENDS are quite evident among U. S. laborers on all levels today. The first is that laborers are becoming more careful in their work activities, thus cutting the percentage of on-the-job accidents. The second is that laborers are not as constrained to want to strike as they have been in other years. Work injuries in manufacturing plants reached a record low rate of 10.4 per million man-hours worked during the first quarter, according to latest reports of the U. S. Bureau of Labor Statistics. This was a continuation of a trend which set in during the last quarter of 1960. Workers involved in strikes, as well as the resulting man-days of strike idleness, during the first half of '61 reached the lowest levels since the end of World War II, according to the BLS. An estimated 1,680 stoppages beginning during the first half of '61, plus those continuing from '60, involved a total of about 621,000 workers and 6,720,000 man-days of idleness, or about one-tenth of one per cent of the estimated working time of all workers in non-agricultural establishments, excluding governments. These trends are significant, for lowering the accident rates and strikeless time both add to personal income and actually stimulate productive sales and pursuits.

EXPORT GAINS in 1960 were reported by the Netherlands and West Germany, two of Europe's largest producers of paint and varnish products for export. The Dutch export for paint amounted to 17,000 tons, more than 20 per cent of total Dutch production, while the West Germans exported 39,000 tons of pigments based on zinc sulphide, 1,190 tons of ready-to-use varnish and 617 tons of ready-to-use paints. Chief recipients of both the Dutch and the West German exports were other West European nations, particularly France, Switzerland, Sweden and Great Britain. Eleven per cent of the Dutch trade was with African nations, despite the unrest on that continent. Asian nations received 21 per cent of the Dutch exports, while Australia and Western Hemisphere nations received six per cent each.

AUTOMOTIVE SHADES seem to be changing with the seasons, according to a survey conducted by a leading pigments manufacturer. New-car buyers tend to favor light shades in the summer months, then change to darker colored autos as the weather turns cold. Automobile manufacturers participating in the survey reported that weather conditions, time of year, geographical location and natural preference are factors which go into autocolor selection. White, tan, beige, light brown and gray are among the warm weather favorites, while darker blues, greens and reds become more popular as the weather turns. The only exception to the rule appears to be black which remains a constant favorite despite the weather.

HOW TO MAKE A MOUNTAIN OUT OF A MOLECULE



Take one molecule, mix well with imagination and presto—change you've created a new product that can make a mountain of profits come your way.

Sinclair aromatic and aliphatic solvents, for example, make possible more profitable manufacture of a wide variety of paints, varnishes, lacquers, insecticides, rubber cements,

and textile coatings. Sinclair's exacting production standards, refinery locations and extensive terminal system mean delivery on time... every time!

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It is impervious to the things that attack and destroy other lacquers.

IT IS NOT INJURED BY
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The Lacquer finish is of vital importance to your brass bed business.

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Phenolics were promoted for use in metal lacquers in this rare, old advertisement published in 1911. Today, 50 years later, these same resins are still used in modern protective coatings.

and still going strong!

When phenolics were introduced a half-century ago—that was news—news that triggered the development of modern plastics. And today, 50 years later, phenolics are still making news—but of a different kind.

It's news when only three coats of paint were needed on the bridge shown below to protect it for nearly a quarter of a century.

And, it's news when *one coating* on the interior of a beer storage tank has lasted for 21 consecutive years—and is still going strong.

These applications make news because of their *quality*. And, quality doesn't just happen overnight. For the 50 years that phenolics have been making news—the research and development people at Union Carbide Plastics have been finding new ways to extend the usefulness of phenolic coatings.

Improve your coatings with the BAKELITE resins and information gained through this experience. We invite you to contact your Union Carbide Plastics Technical Representative, or write: Dept. KM102P Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17.
In Canada: Union Carbide Canada, Limited, Toronto 12.



The San Francisco Bay Bridge, painted only three times since 1938. Paint cycles, using BAKELITE phenolic-based coatings, average over seven years, despite constant exposure to sun, rain, moist salt air, fog, industrial exhaust fumes.



The interiors of not just one but of 14 beer storage tanks at a large midwestern brewery have been protected since 1939 with a baked coating based on BAKELITE phenolics.

NOW...AT NO EXTRA COST

BAKELITE phenolic resins CKM-5254, 2400 and 2432 are crushed and packed in 50-lb. multiwall bags. You get easier storage—easier handling—faster, more precise formulation!

TO SERVE YOU BETTER

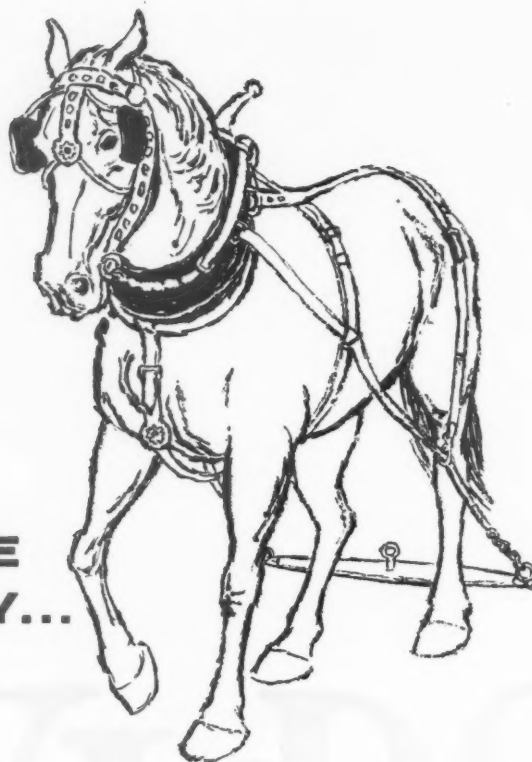
In addition to the regular Union Carbide Plastics distribution points, these well-known agents now handle BAKELITE phenolic coating resins:

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D. H. Litter & Co., New York & Ballardvale, Mass.
A. J. Lynch & Company, Los Angeles, Calif.
A. C. Mueller Co., Cleveland, Ohio
The Cary Company, Chicago, Ill.
Van Horn, Metz and Company, Conshohocken, Pa.



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**STILL THE
WORK HORSE
OF THE INDUSTRY...**



RCI BECKOSOLS

Because of their versatility, proven performance, economy and widespread acceptance, alkyds continue to be the work horse resins of the paint industry . . . despite increased talk of more glamorous and more expensive resins! Reichhold is the largest manufacturer of alkyd vehicles. In addition, RCI supplies a wide range of short; medium and long oil alkyds as well as modified types.

There's an RCI BECKOSOL to meet your specific needs. The following are representative of some of the 68 BECKOSOL alkyds currently available from RCI:

In traffic paint formulations . . . RCI BECKOSOLS P-650 and P-750 (medium oil alkyds).

For interior architectural enamels and exterior trim paint formulations . . . RCI BECKOSOLS P-470 and P-296 (long oil alkyds).

For baked enamel finishes . . . RCI BECKOSOL 1307 (a short oil alkyd).

For nitrocellulose finishes . . . RCI BECKOSOLS 1323 and P-222 (plasticizing vehicles).

For metal primer formulations . . . RCI BECKOSOLS 1303 and 1341 (modified alkyds).

For air-dry maintenance and industrial finishes . . . RCI BECKOSOLS 1331, P-323 and P-531 (medium oil alkyds).

RCI is constantly developing newer alkyd vehicles to meet specialized applications. An outline of your requirements will receive prompt attention.

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REICHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.



MANAGEMENT NEWSLETTER

A MONTHLY REPORT FOR MANAGEMENT OF THE COATINGS INDUSTRY

WASHINGTON REPORT

SEPTEMBER, 1961

A "GREAT DEBATE" is raging in inner administration circles over the White House's apparent abandonment of its fight on the Federal Reserve Board's "hard money-high interest" policy. President Eisenhower embraced the FRB's policy, which caused three significant business recessions during his eight years in office.

Leon H. Keyserling, former chairman of the President's Council of Economic Advisors (1950-1953), who still speaks for a good body of New Frontiersmen, told the Joint Committee on the Economic Report recently that if the President continues to abandon the fight, there will be "moderate" and perhaps even "extremely low" growth rates in the coming years.

"If I should turn out to be nearly right once again (and he was right for years on this issue), we would forfeit, during the 1961-65 period, about \$390 billion worth of total national production and about 20 million man-years of employment opportunity."

Representative Wright Patman (D. -Texas) chairman of the House Committee on Small Business, privately has been scornful of the President's inaction on interest rates. He has pointed to a new firming of interest rates as indicating that the White House has relaxed the pressure it started to put on the FRB.

Mr. Keyserling said that the "mild" and "for the most part desirable" proposals President Kennedy has made, including those on which Congress has not acted, are "not adequate to offer any likelihood that our economic performance during the next few years will average appreciably better than since 1953."

Interest rates are important to business in many ways. If credit is tight, businessmen (even big ones) have to scuttle around for money when they need it for operations. High interest rates enter into the cost of things, make price rises inevitable. Uncle Sam is now paying more than \$9 billion a year interest on the federal debt. Interest income is liable to be as high in this first year of the New Frontier as it was in the last Eisenhower year, despite JFK's campaign promises.

A JOINT GOVERNMENT-INDUSTRY task force, one group representing the Food & Drug Administration and the other representing the National Paint, Varnish and Lacquer Association, is working to make life as easy as possible for manufacturers under the new Federal Hazardous Substances Labeling Act, whose effective date has been pushed up to next February 1.

There is optimism that the paint and varnish industry will receive special regulations under Section 3(c) of the law, which provides for this when hazards presented by substances are of minor nature. The FDA Commissioner, George Larrick, has authority virtually to exempt the industry from many of the law's more onerous provisions, if he finds that it presents only minor dangers. A strong showing that the industry's products are of minor consequence in poison cases has been made.

It is felt here that Congress, judging by the debates over the poisonous label act, was more concerned with food products and



MANAGEMENT NEWSLETTER

items in daily kitchen or household use than in paints and varnishes, industrial oils and similar substances which undoubtedly are poisonous but to which children and other irresponsible members of the public are not exposed, except by design.

Both FDA officials and NPVLA officials are convinced that the industry will be able to live with the regulations finally to be promulgated.

FACTORY SHIPMENTS of paint, varnish and lacquer totaled 179.8 million in June, or six per cent above the May totals and one per cent above the same month for 1960, the U. S. Bureau of the Census has reported here.

June production of 62.5 million gallons was seven per cent over the May figure of 58.2 million gallons. The figures are not adjusted for seasonal variations and number of working days, but in this case are likely on the beam, for the working days were essentially the same in both months.

Although figures are not in, July is believed to have been a better month than June. The value of total new construction put in place in July, 1961 amounted to \$5.4 billion, or about one per cent more than in June. Spending for total new construction in July, 1961 was five per cent above the July, 1960 level.

Seasonal trends usually indicate a one per cent decline in new private construction between June and July. This year, however, there was a four per cent increase. A normal two per cent increase in industrial construction is expected in the two months, but this year construction in that category also showed a four per cent increase in July over June.

THE WHITE HOUSE endorsement of 50,000,000 H-bomb shelters, mostly to be built by private individuals, and subsequent developments may make it possible for the paint and varnish industry to open up a vast new market.

While the emphasis in the average family will be on economy and plainness in the actual shelter (because of the costs, of course), there's a chance that size and beauty of the shelters may become a "status symbol." In any case, a lot of paint can--and probably will--be used to make the shelters cozy and comfortable.

There's great confusion here--for the time being--about how best to encourage people to build shelters, and how much Uncle Sam should participate in the urging. Some Senators consider the program a waste of money--as it might well be, if no war materializes. Others consider it merely "insurance," a necessity but nothing to get excited about. But the shelter building program is due for a big boost, in one way or another.

The U. S. Chamber of Commerce, Washington 6, D. C., has a free leaflet, Fiction and Facts About Family Fallout Shelters, it is using to promote public participation. It offers special prices for bulk orders (more than nine to a person).

"As Russia achieves an unmistakable capability of launching a successful nuclear attack on the United States, our nation must have more than a retaliatory capability," the leaflet notes. "We must also have the ability to survive such an attack, to recover, and to rebuild..."

NEW from VELSICOL

Ask your
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representative...

how to
multiply
your profits
on multi-
color paints
with new
**Velsicol
X-37 resins!**



Work with this man . . .

*Your Velsicol representative,
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you make better products for less!*



Multi-color paint sales are soaring with their new acceptance in commercial and residential interiors as well as in new product finishes and do-it-yourself spray cans. Real profit can be realized now through the use of Velsicol X-37 to reduce raw material costs of multi-color paint formulations. Extensive testing of multi-color paint formulations using Velsicol X-37 as a component proves that the only thing cut was the cost; performance and quality with Velsicol X-37 remain at optimum. Velsicol X-37 formulations spray easily, wear well, have good adhesion and proven shelf life. ■ Write now for testing samples and technical data on Velsicol X-37 resins . . . then watch those spots before your eyes turn to dollar signs!

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samples
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- ☐ Please send test samples of Velsicol X-37 Hydrocarbon Resins.
☐ Please send complete technical data. ☐ Have representative call.

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VELSICOL

BULLETIN:

New Shell pocket computer helps calculate the evaporation rate of a hydrocarbon solvent in minutes—can be used right at your desk

Shell has invented a handy six-inch computer that lets you calculate solvent evaporation rates at your desk. It's called the Evapo-Rater.*

Here's how it can save you time and help avoid costly trial and error experimentation.

FOR THE first time you can determine solvent evaporation rates without leaving your office.

Shell's new Evapo-Rater does the work for you.

Supplements laboratory device

For years manufacturers have been familiar with the Shell Thin Film Evaporometer—used to determine evaporation rates.

But the Evaporometer resides in laboratories. It is expensive and time-consuming to operate. And it stands about 3 feet high.

So now Shell has invented the new six-inch Evapo-Rater, shown above.

Gives answer in minutes

The new Shell Evapo-Rater is based upon hydrocarbon evaporation rates determined by the Thin Film Evaporometer. It approximates results you can obtain with an Evaporometer, and gives you an answer in a matter of minutes.

The Shell Evapo-Rater makes selection of the correct hydrocarbon sol-



New Shell Evapo-Rater, above, determines solvent evaporation rates in minutes. Shell is offering the Evapo-Rater to help users select the correct hydrocarbon solvent.

vent quicker and easier than ever. It reduces the need for extensive trial and error experimentation.

Works for blends of solvents

And it permits you to determine the evaporation rates for *blends* of hydrocarbon solvents as well. All this can save you valuable time and money.

A limited supply of Evapo-Raters is available for solvent consumers and can be obtained from your local Shell Oil representative. Call him today.

For address of nearest Shell representative, write Shell Oil Co., 50 West 50th Street, New York, N.Y.



A BULLETIN FROM SHELL
—where 1997 scientists are working
to provide better products for industry

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ALKYL ESTER OF LAC ACIDS

Specially treated and processed for use with nitro-cellulose, ethyl cellulose, maleics, phenolics and other film-forming materials.

As countless formulators have already discovered, Mantrose's ES-45 Shellac Ester improves the gloss, flexibility, adhesion, leveling and ultraviolet light resistance of lacquers. And it's stable... highly tolerant to hydrocarbons, ketones and ester solvents.

Color Critical—Because of its extremely light color (Gardner Holt 6-7), you can safely use ES-45 in a wide range of coating and ink formulations. Furthermore, you can depend on its quick solvent release to yield films which set up rapidly to a tack-free stage.

Free working samples, technical assistance, and

product literature are available on request. Just call or fill out and mail coupon.

The Mantrose Corporation

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Plant address: Attleboro, Mass. • Established 1919

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THE MANTROSE CORPORATION

Dept. PVP, 99 Park Avenue, New York 16, N. Y.

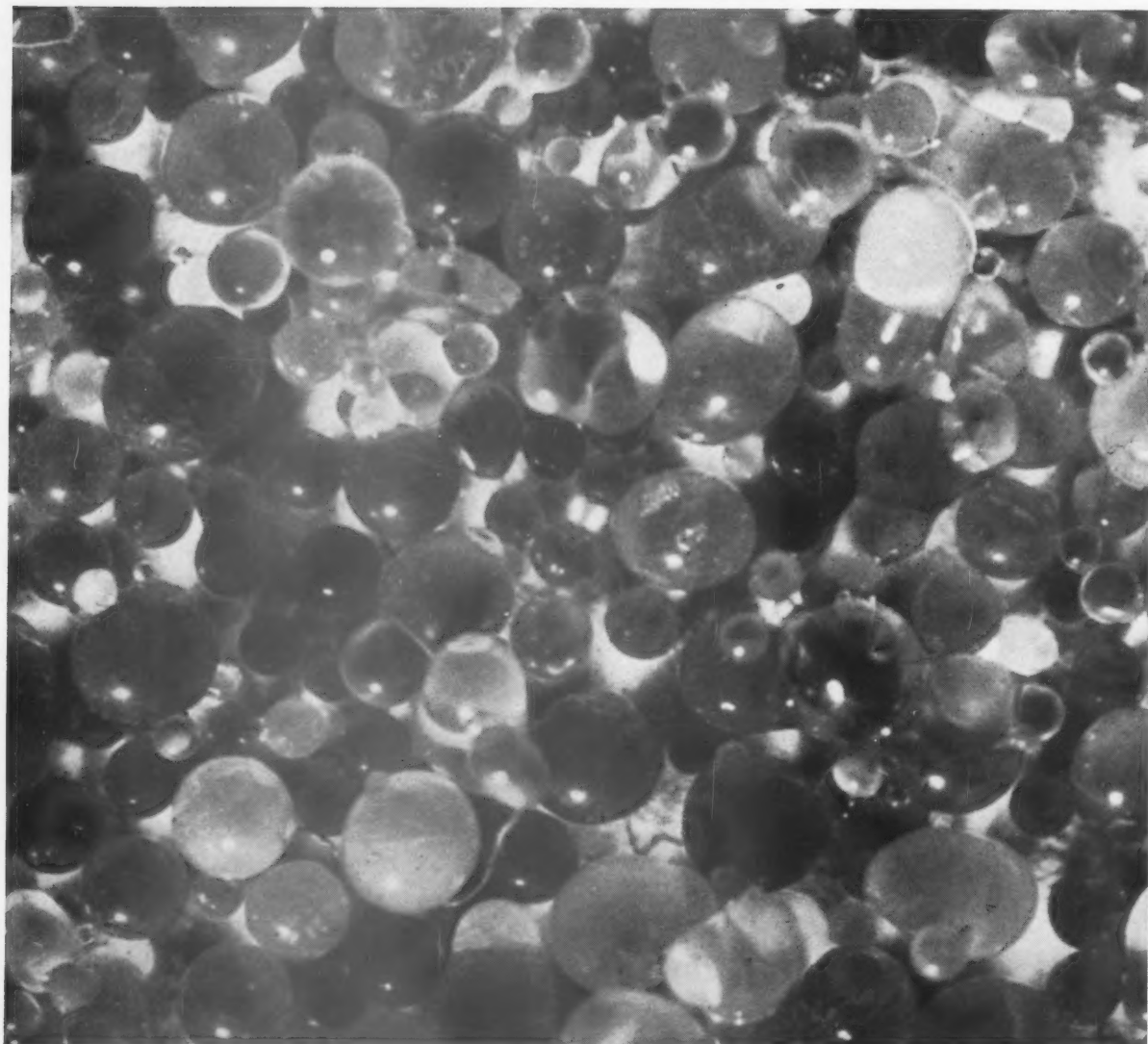
I am interested in using ES-45 Shellac Ester for _____
Please send me: ☐ Working sample ☐ Product literature

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____
.....



What are glass beads doing in the traffic paint picture?

Glass beads—which may derive greater reflecting power from the higher refractive index imparted to the glass by TITANOX®-TG, the non-pigmentary grade of TiO_2 —are the “frosting” that give greater reflectivity and visibility to traffic paints. But this is only half the story.

TITANOX-RCHT is the titanium (rutile)-calcium pigment that gives the traffic paint film high whiteness, brightness and hiding power at low cost per gallon. When used in combination with suitable vehicles, and often with supplementary extender,

TITANOX-RCHT helps promote the durability that keeps the paint on the road.

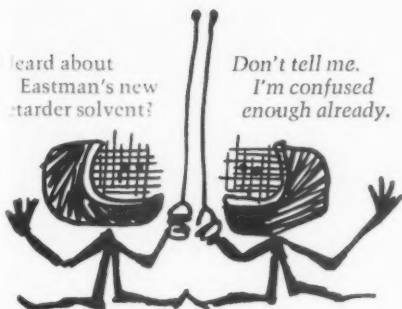
Specifications that call for “pure” titanium dioxide are readily met by the TITANOX “pure” pigments in the TITANOX-A and TITANOX-RA lines. For all other types of paint, one or more TITANOX pigments fit the most exacting requirements of paint production programs. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments Ltd., Montreal.

TITANIUM PIGMENT CORPORATION
SUBSIDIARY OF NATIONAL LEAD COMPANY



Heard about
Eastman's new
retarder solvent?

Don't tell me.
I'm confused
enough already.



How can you
be confused if
you don't know
about it!

It's easy.
Too many lacquer
solvents now.



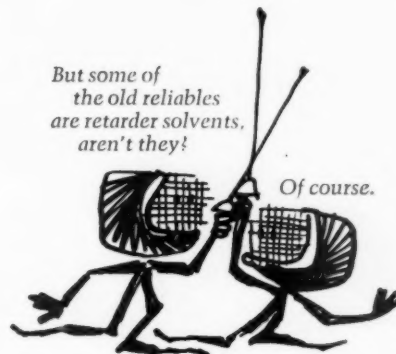
But this one's different.

I know, so are
all the others; little bit
here, a little
bit there. I'll
stick to the
old reliables.



But some of
the old reliables
are retarder solvents,
aren't they?

Of course.



With several retarder
solvents in
most formulations,
right?

You're pushing me, boy,
but that's a fact.



Well, one retarder
solvent to replace
several would be a
point for simpler
formulations,
wouldn't it?

What are you
trying to get
across to me,
man?



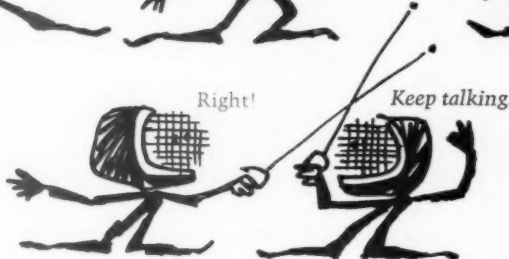
Just what I
said. Eastman's
MIAK for all.

And all for
MIAK, huh?



Right!

Keep talking.



The lowest solution viscosity of
any retarder solvent on the
market, superior flowout and
leveling, excellent blush control,
rapid release, economy...

Hold it! You
just touché'd me
where I live.



MIAK Eastman high-flow
retarder solvent

High solvency in a low-evaporation-rate (0.55) solvent means that MIAK can cut down on the total number of formulation solvents and still provide good flowout, leveling, and blush control. Yet MIAK releases rapidly, allowing final finishing operations to proceed without delay. This combination of properties permits formulating to be simplified while lacquers are being improved. And this simplification, combined with a cost of \$1.18/gal., can result in real savings. Ask your local Eastman representative for more details about MIAK, or write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSFORD, TENNESSEE.

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; Atlanta; Boston; Buffalo; Chicago; Cincinnati; Cleveland; Detroit; Greensboro, North Carolina; Houston; Kansas City, Missouri; New York City; Philadelphia; St. Louis.
Western Sales Representative: Wilson & Geo. Meyer & Company, San Francisco; Los Angeles; Salt Lake City; Seattle.



**A Complete Line of
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every formulating need**

Castung® Dehydrated Castor Oil—the fast drying non-yellowing oil of exceptional flexibility and adhesion . . . for paints, alkyds, varnishes, putty and calks . . . in GH and Z3 viscosities.

Dehydrated Castor Fatty Acids—for alkyds and epoxy resin modification . . . 9-11 Acids provide superior flexibility, adhesion, baking speed and color retention . . . 135 Acids offer economy with minimum loss of performance.

Blown Castor Oils—non-migrating, non-volatile plasticizers contributing lasting flexibility, gloss and adhesion to lacquers, coated fabrics and calks . . . popular grades: Pale 4, Pale 16 and #15 Oils.

Ester Plasticizers—highly efficient for cellulosic, vinyl and natural resins . . . in lacquers, contribute exceptional low temperature flexibility and crack resistance, gloss and depth . . . Flexricin® P-4, P-6, P-8, 61 and oxidation-stable Paricin® 8.

Epoxy Plasticizers—resistant to heat, light and oxidation . . . protect nitrocellulose, ethylcellulose and other polymers from yellowing and deterioration . . . Estynox® 130, 140, 308 and 408.

Gellant Additives—for pigment suspension, controlled penetration, non-sag, improved brushability . . . Thixcin® R and M-P-A® in paints and enamels; Thixcin E in polyesters.

Alkyd Catalyst—for rapid alcoholysis leading to clear light-colored alkyds with no filtration normally required . . . Lithium Ricinoleate in powder or 50% aqueous paste forms.

Castor Polyols—for superior urethane finishes.

Refined Castor Oils—finest grades available . . . AA® for light color and low acid . . . DB® for lowest moisture . . . quality #3 and Imported #1.

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Start to finish responsibility in all phases of castor oil processing—from the seed to the finished product—has been Baker's business for over 100 years. It assures you of uniform quality, steady supply, and dependable service. Baker research assures you too of sound technical assistance in helping with formulation and production problems. You can rely on Baker . . . after all, Castor Oil is our middle name.

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Medium Red	No. 100, 1006
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Maroon	No. 120

CADMIUM YELLOW PIGMENTS

Cadmium Lithopones

Primrose	No. 20, 206
Lemon	No. 30, 306
Golden	No. 40, 406
Dark Golden	No. — 456
Orange	No. 50

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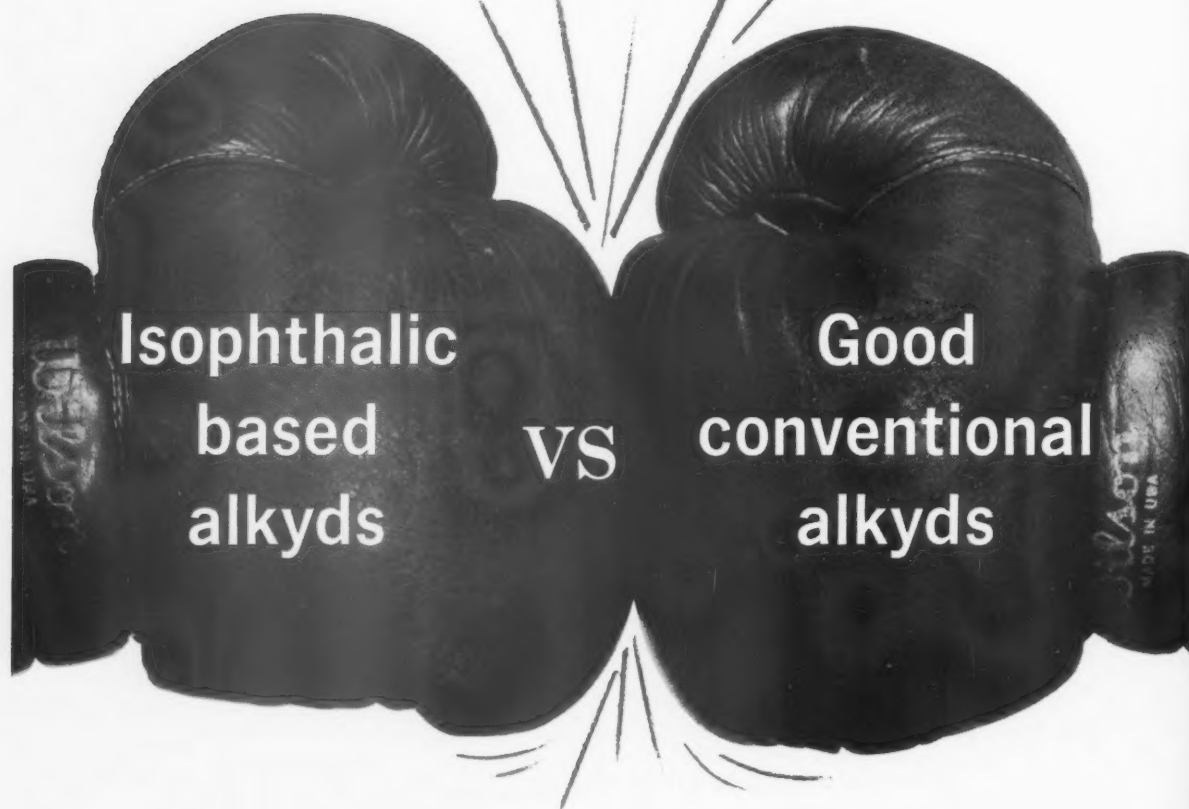
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The verdict is in—provided by a reputable independent laboratory. The results score higher ratings for the isophthalic based resin formulations. But, see for yourself—get the full count.

Write Oronite for detailed information on properties, performance, evaluations and costs shown by these significant tests.
Address your inquiry to the Oronite Office nearest you.



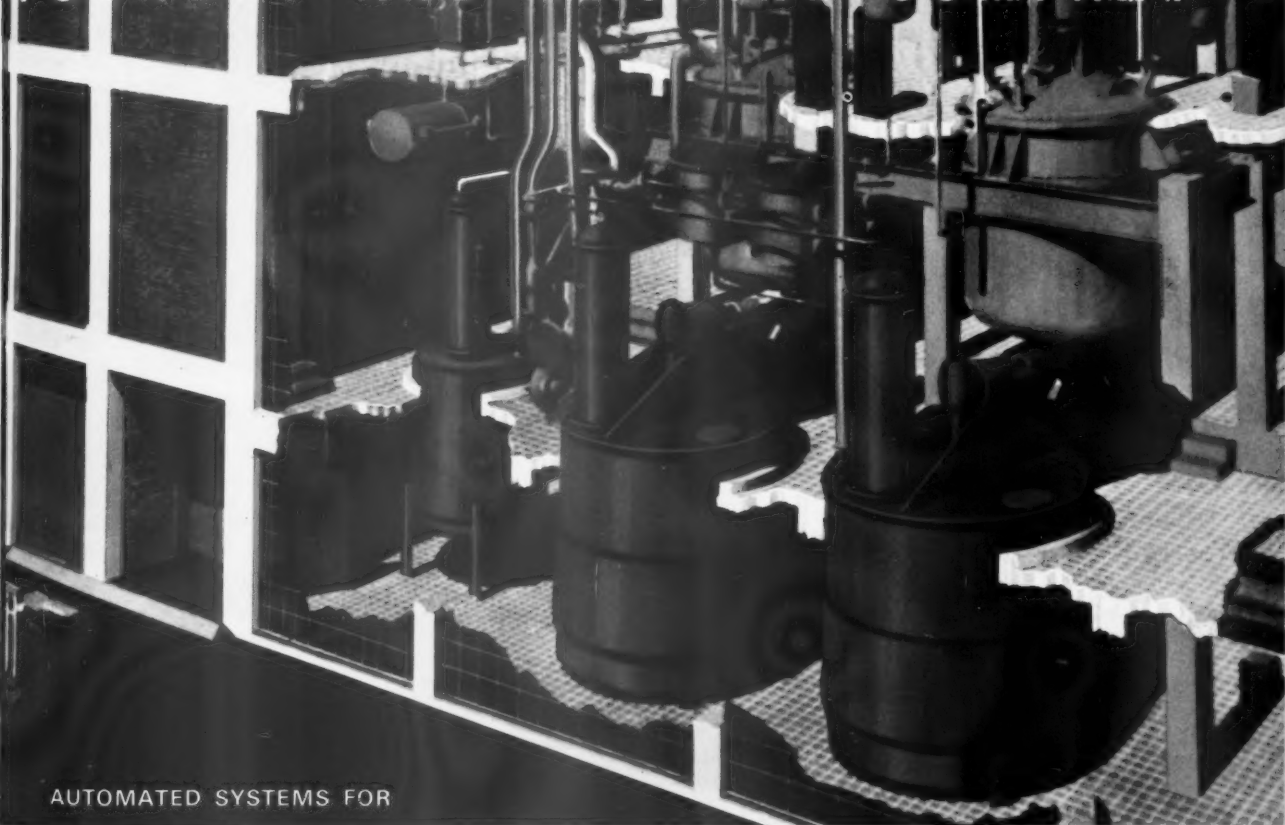
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FOUNDRY AND MACHINE COMPANY



AUTOMATED SYSTEMS FOR

PROCESSING SYNTHETIC POLYMERS

Illustrated is a system at Rinshed-Mason's most recent plant expansion in building #42.

Three Patterson resin systems are reported to result in greater accuracy, a reduction in material handling, and insure maximum safety in the production of acrylics, alkyds, epoxies, polyesters and many other polymers. A Patterson pilot plant is also in operation. Shown are reaction vessels typical of the kind of engineered systems for which Patterson has become so famous. Check Patterson for all systems and mixing, and grinding equipment.

**TURN THE PAGE
FOR MORE INFORMATION**

Patterson Foundry & Machine Company

Gentlemen:

Please arrange to contact us about a _____

NAME _____

TITLE _____

COMPANY _____

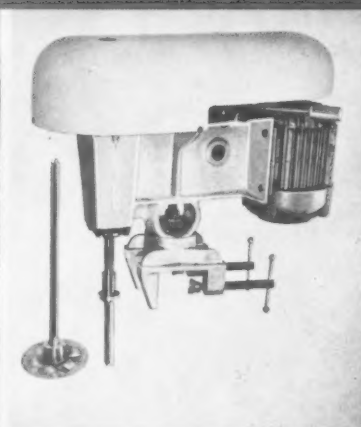
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Current Production at **Patterson** FOUNDRY AND MACHINE COMPANY for the Paint & Varnish Industry



Ball Mills

Ruggedly constructed, these mills are made with steel heads, accurately bored to receive the steel shells. Shafts or gudgeons are accurately machined; they are ground and polished. Main bearings are heavy duty, self-aligning, 100% oversized. Patterson ball mills are renowned the world over for their quality and dependable service. A complete brochure is available.



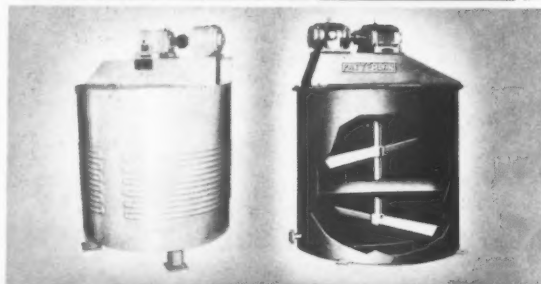
Wizard Portable Variable Speed Agitator

Power as you want it from a fixed speed motor — AT THE TURN OF A HANDLE! This new mixer outdates any model now on the market. It's light! It's compact! Provides up to 50% more horsepower than any competitive unit at this price! A new chuck system with a quick-release allows for easy removal of the shaft and impeller from the agitator unit for use time after time without cleaning! Write for complete brochure! Ready now for immediate shipment from stock. Also the all new 5 hp Wizard, priced far below others — nothing like it; an entirely new design!



Ceramics for Grinding Media and Lining Blocks

Patterson offers immediate delivery on all types of mill linings and grinding media. A choice of "Arlcite" or "Porox" mill and tank linings and grinding media materials is a guarantee of quality and satisfaction.



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These standard design tanks are available with plain steel, stainless, steel or Porox linings. Patterson can supply these promptly in sizes from 124 to 716 gallons and larger with fan-cooled motors and specially designed baffles and paddles.

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to express
our thanks... the
first 100 will receive
a fine ball point pen with
a draftsman point!

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**NOW
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A NEW SOURCE IN 1961 FOR n-BUTANOL AND iso-BUTANOL

A new Dow Badische plant for manufacturing n-Butanol and iso-Butanol is scheduled to go on stream in 1961. These products will be marketed by The Dow Chemical Company and are available singly or in mixed shipments with other Dow products such as—

Dowanol® glycol ethers • Ethylene glycols • Propylene glycols • Glycerine • Chlorinated solvents • Dowfax® 9N9 surfactant.

Dow Badische is a new company owned jointly by The Dow Chemical Company and BASF, Overzee, N.V. Dow Badische unites a combination of American and European production and research know-how with American marketing skills. These alcohols are a new addition to this company's expanding product line.

For more information, write to THE DOW CHEMICAL COMPANY, Midland, Michigan.

THE DOW CHEMICAL COMPANY



Midland, Michigan

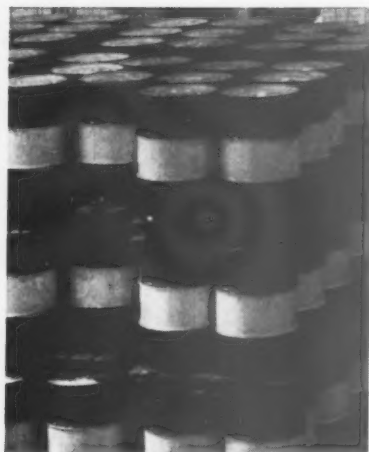
News of Nitrocellulose...

A BULLETIN FROM THE CELLOFILM CORPORATION



- Should you buy in solution? What are your storage problems? • How can you achieve uniformity from batch to batch?
- Some practical thoughts about nitrocellulose...

Nitrocellulose has been with us for so long that we may overlook its versatility as a basic raw material. The purchase of nitrocellulose *in solution*... for use as a *prime* raw material in the production of lacquers, coated textiles, inks, adhesives, plastics, etc. ... is a constantly growing trend. There are good reasons... reasons well worth considering for your nitrocellulose requirements.



When nitrocellulose is delivered in solution, whether by tank truck or in drums, the need to mix *your* own solution is eliminated. This means that it is not necessary to set aside a portion of your plant, and *part* of your production time, to process nitrocellulose. The employees who were formerly engaged in processing the nitrocellulose can be assigned more profitable and productive functions.

From the **PURCHASING AGENT'S VIEWPOINT**, the purchase of nitrocellulose in solution represents closer *cost* control and more accurate account-



ing. *Substantial* insurance savings will result from the elimination of *storing and processing* nitrocellulose.

From **MANAGEMENT'S VIEWPOINT**, the purchase of nitrocellulose in solution represents a better utilization of *men, machinery and the plant facility*.

To **PLANT TECHNICIANS**, the purchase of nitrocellulose in solution affords a far more accurate control of solution from batch to batch. Cellofilm keeps a running record of its customers' requirements and

can *prepare immediately*, whatever viscosity or solvent system.

Cellofilm has pioneered in the development of nitrocellulose in solution... we are specialists. Whatever your requirements are, be sure to have your Cellofilm technical representative check out all aspects of the problem with you. He can advise you on the desirability of utilizing either drum or tank truck shipment. If tank truck shipments are logical, he can also help you plan the proper storage facilities for your needs. Send for *your free* Nitrocellulose Viscosity Prediction Chart. *Just* fill out and *mail* the coupon below.



CELLOFILM CORPORATION
WOOD-RIDGE, NEW JERSEY

We cut our own nitrocellulose

We purchase our nitrocellulose in solution

Yes

No

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You can improve performance of latex house paint systems



Eagle-Picher's extensive tests indicate that 202 Basic Silicate White Lead in latex first coats will approximate the performance of solvent primers.

You retain all of the easy-to-apply advantages of water emulsion paints, but in addition, you get these improved characteristics over self-primed latex house paints systems:

- Controls staining by water soluble dyes or tannins.
- Inhibits corrosion—reduces nailhead rusting.
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- Prevents film rupture—increases adhesion.



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Eagle-Picher 202 Basic Silicate White Lead . . . as an oil-type additive for use in latex first coats or for one-package oil-latex primers . . . supplies unusual merchandising appeal and consumer acceptance.

Formulations and test results are available in an informative booklet recently prepared. Write for your copy of "Eagle-Picher 202 Basic Silicate White Lead in Water Emulsion Paints." Use handy coupon below.

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Dept. PVP-961

Please send me a copy of "Eagle-Picher 202 Basic Silicate White Lead in Water Emulsion Paints."

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Periodic heat tests gauge color stability of ACINTOL® FA 3 fatty acid.

Arizona takes extra steps to bring you the most color-stable fatty acid

Arizona offers the lightest fatty acid at its price and ACINTOL® FA 3 keeps its color characteristics through heat processing. It is heat-tested at several points during production for color stability. The finished product is stored in aluminum tanks, under a protective blanket of inert gas. Tank cars and shipping drums have the gas blanket and a special lining to prevent color degradation.

Extreme lightness of color, vastly improved alkyd color retention—important reasons why ACINTOL FA 3 answers paint industry needs. ACINTOL FA 3 is uniform—the result of careful quality control through every production step.



For data sheets, write Arizona Chemical Company, 30 Rockefeller Plaza, N.Y. 20, N.Y.
World's Largest Supplier of Tall Oil Chemicals
ACINTOL® Tall Oil Products, ACINTENE® and ARIZOLE® Terpene Products



Acryloid—key to durable clear finishes on metal

Rohm & Haas offers fifteen different acrylic vehicles in a range of hardness and flexibility, suitable for a wide variety of industrial applications. Clear or pigmented baking finishes possess excellent resistance to heat, food staining and detergents.

The unbeatable acrylic combination of gloss, adhesion, durability, and color retention is developed to maximum effectiveness in ACRYLOID® resins. Water-clear ACRYLOID resins are compatible with a wide range of pigments, produce coating formulations of exceptional stability.

With the many ACRYLOID resins to choose from, your customers will find it easy to fit ACRYLOID-base coatings into their finishing systems. And Rohm & Haas can offer you a wealth of formulating and testing experience in using ACRYLOID resins to your best advantage.



Write Dept. RD-8 for performance data and formulating information on ACRYLOID acrylic coating vehicles. Free booklet sent on request.

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&
HAAS**
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YOU HIT THE BULL'S-EYE

WITH

ASBESTOL AND MICRO VELVA

EXTENDERS

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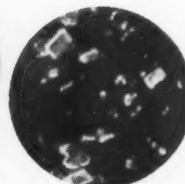
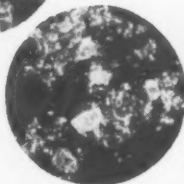
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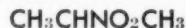
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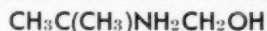
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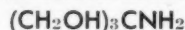
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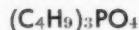
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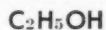
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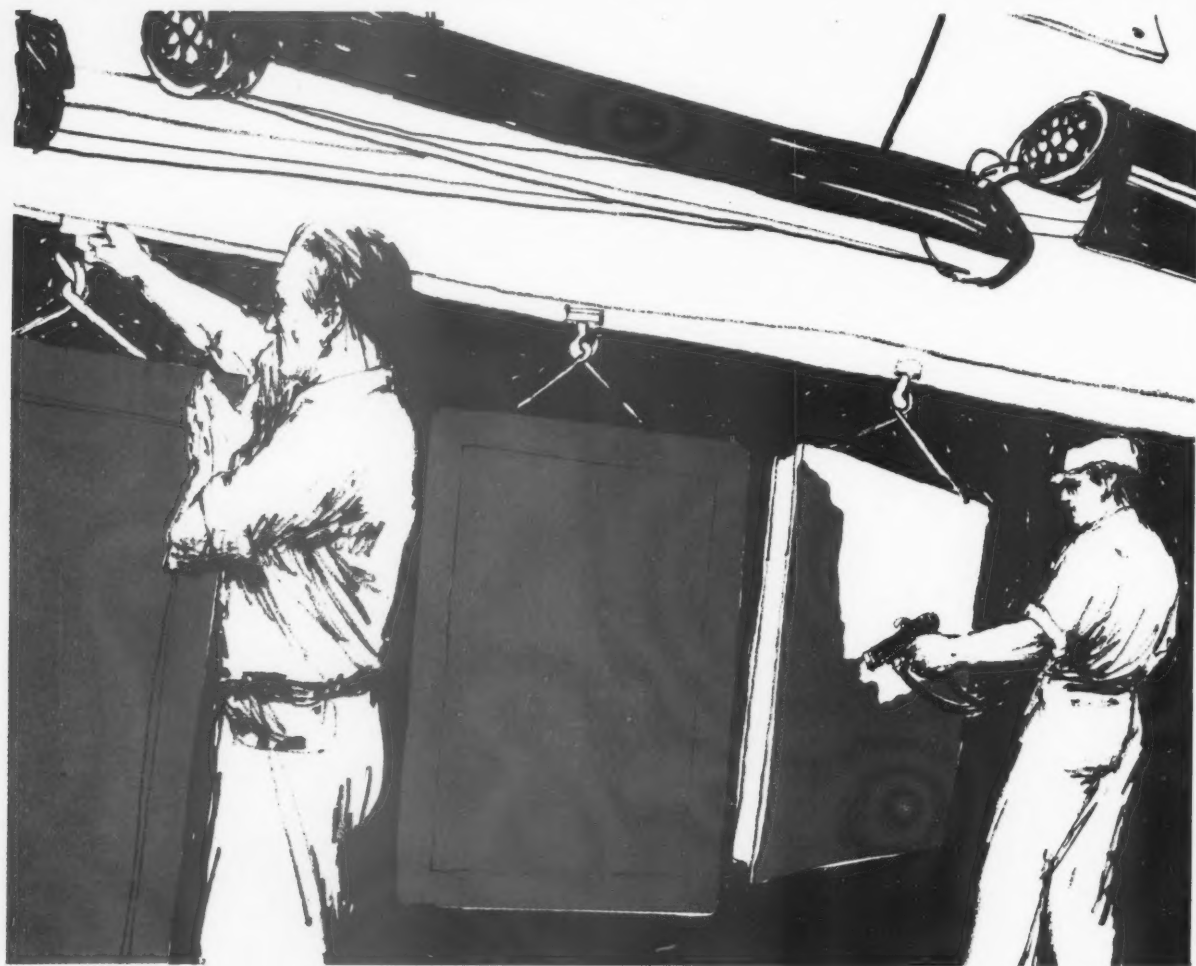
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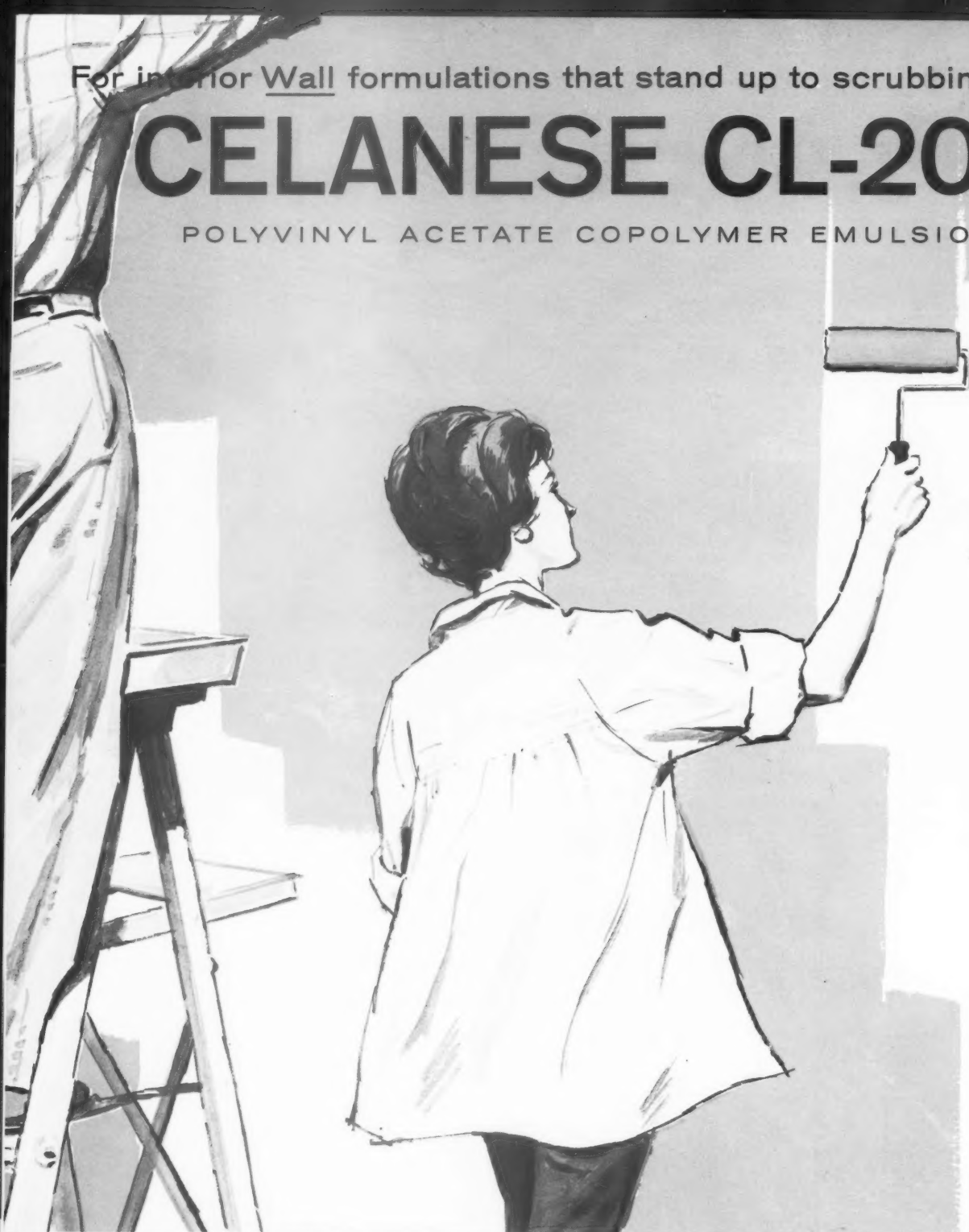
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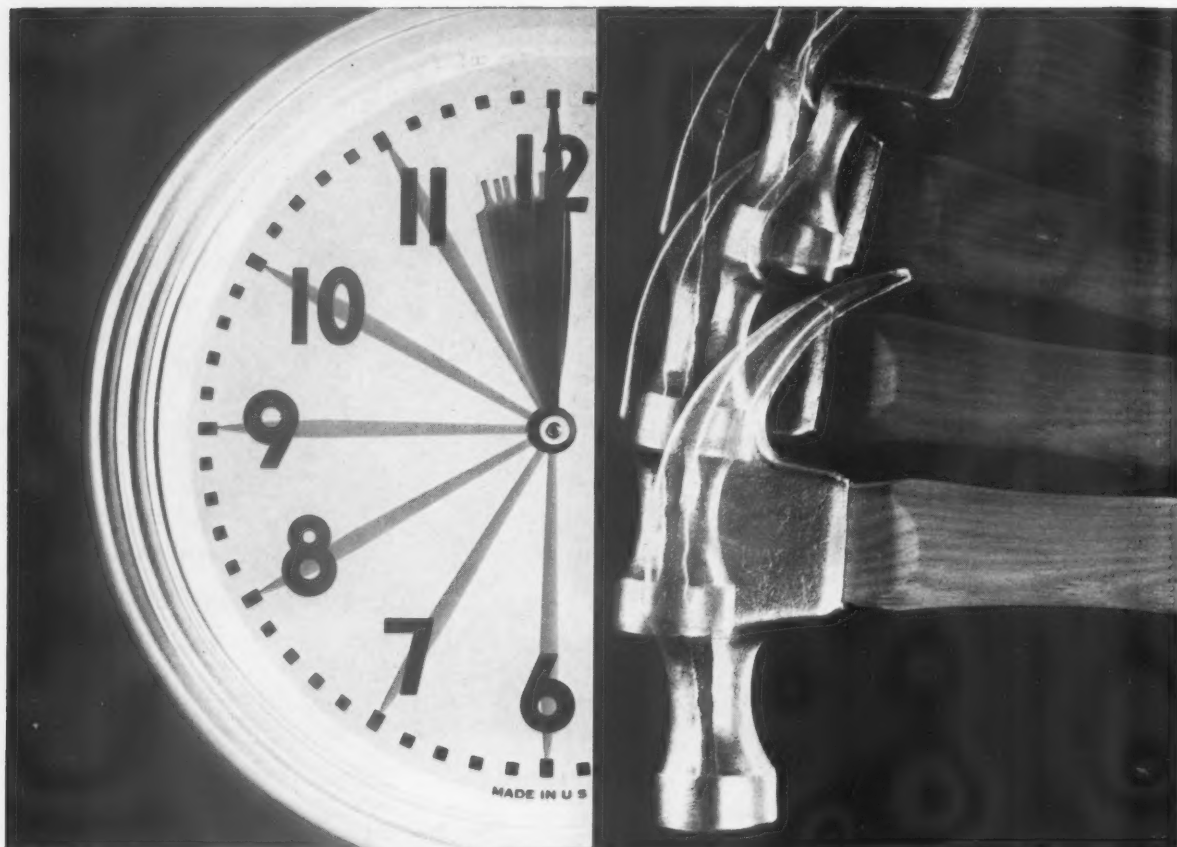
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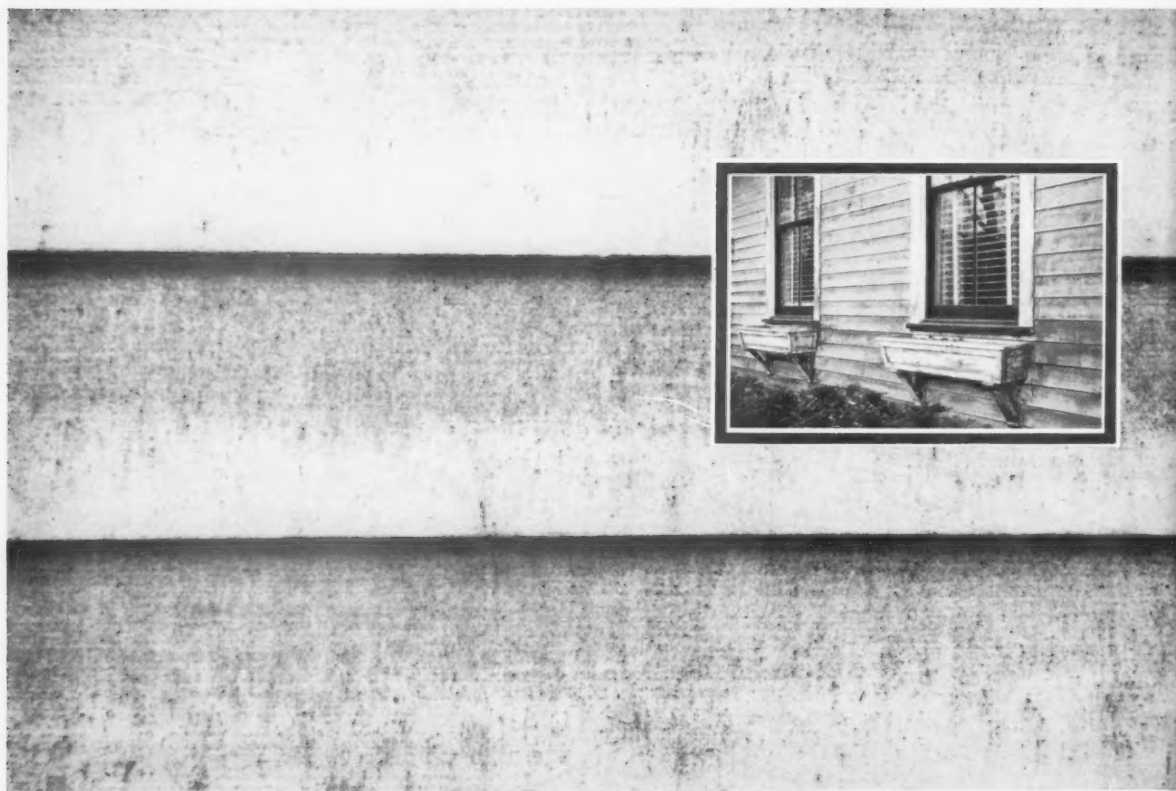
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Dept. P-122



MILDEW

Did this to a freshly painted house in New Jersey

These pictures could have been taken in the Bayou Country of Mississippi, but they *were* taken in New Jersey just two months after this house was painted. The owner is suing the painter. The painter is unhappy with his supplier. And the supplier is frustrated too because the paint was of a good quality. Nevertheless, it deteriorated to the condition in which you see it owing to the destructive effects of mildew.

Formerly considered a Southern problem exclusively, mildew fungus now flourishes in the North as well as the South owing to prevailing conditions. Air-borne mildew spores can develop wherever there are high average temperature and humidity, subdued light (as on the north side of a structure), and food. Raw wood and the organic oils in paint both sustain mildew growth. When new paint is attacked, it is usually *from underneath* because it was applied to a contaminated surface. The result is discoloration and actual destruc-

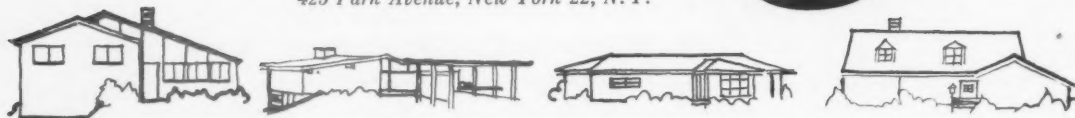
tion of parts of the coating. This process can start during any damp spell in summer.

Fortunately, mildew can be prevented easily and inexpensively with *Nildew*, a tried and proven fungicide. For complete, long-lasting protection, add it to paints and primers, both, during their manufacture. A little of it goes a long way! Therefore, Nildew adds only pennies to the cost of paint—and dollars to its sales appeal. In areas where it is not commonly used, it offers paint manufacturers a new competitive advantage.

Nildew solutions are clear and light-colored—stable in storage—free from precipitation at low temperatures, assuring continued activity throughout the mixture. They are adapted to water- and oil-based paints both and have no adverse effects on the quality of coatings. For further information about Nildew, get in touch with Naftone! Telephone: PLaza 1-5544.



425 Park Avenue, New York 22, N. Y.





A PENNSYLVANIA DUTCH FARMSTEAD. Inks used throughout this piece are made with Du Pont color pigments. Stock used received its opacity and whiteness from Du Pont "Ti-Pure" titanium dioxide pigment.

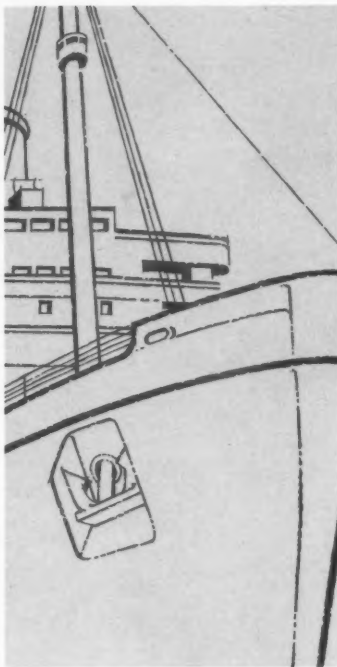
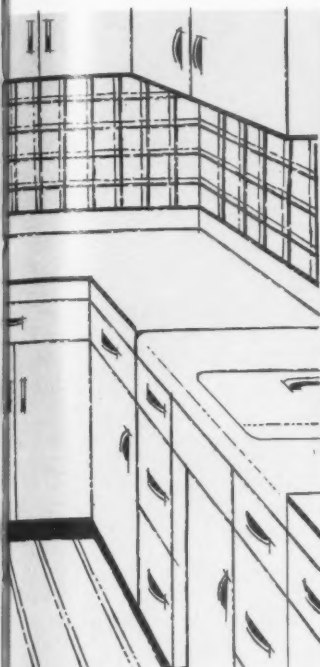
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WHEREVER WHITE OR COLOR PAINTS ARE USED
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REDS

Du Pont's full line of "Monastral" Reds, Scarlet, Maroon and Violet combine excellent lightfastness with resistance to heat, bleed, solvents and chemicals. These clean, strong pigments blend well—"Monastral" Violet R RT-733-D with Molybdate Orange, for example, produces low-cost brilliant reds. Use them where *lasting* color is needed in your paint systems.

BLUES

You get the ideal combination of high color, strength and flocculation resistance in Du Pont's complete line of "Monastral" Blues. These pigments also show outstanding resistance to acids, alkalis, soap and bleed. Du Pont offers them in a wide range of colors including the popular green-shade blue ("Monastral" Blue GF BT-417-D) and a red-shade blue ("Monastral" Blue RF BT-427-D).

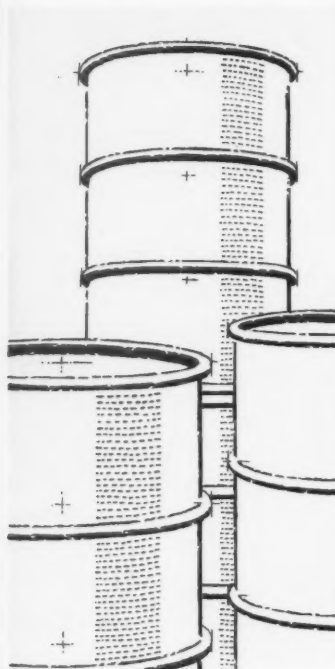
ORANGES

Du Pont offers you a full line of Molybdate Orange pigments of unsurpassed brightness and resistance to fading. These oranges range from the light shade YE-637-D to the dark shade YE-721-D, blend with organic reds for a wide range of reds for industrial finishes. Your Du Pont representative will select the right Molybdate Orange for your particular application.

GET THE FACTS ABOUT OTHER DU PONT PIGMENTS

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ORANGES

Du Pont offers you a complete line of Molybdate Oranges with lightfastness unexcelled in the industry. These oranges range from the light shade YE-637-D to the extra-dark YE-721-D, blend well with dark organic reds for a wide range of reds for industrial and automotive finishes. Your Du Pont pigments representative will help you select the right Molybdate Orange for your particular application.

YELLOW

For replacement of lead chroma pigments in trade sales paint Du Pont offers a line of organic yellows, including "DALAMAR" Yellow YT-717-D and Toluidine Yellow R YT-729-D. Both have excellent acid resistance, good package stability and are superior to lead chromates in alkali and soap resistance. For an outstanding metal primer pigment, try Zinc Yellow Y-539-D, a soft-texture material.

DU PONT PIGMENT COLORS . . . AND A COMPLETE

the advantages



lead chromate
scales paints,
of organic yel-
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dine Yellow
ave excellent
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rior to lead
d soap resist-
nding metal
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BROWNS

By using blends of Du Pont "Monastral" Reds, Greens and Molybdate Oranges, you can produce rich chocolate browns of superior lightfastness, heat and bleed resistance and in a range of tints not obtainable with standard brown pigments. If gloss and gloss retention are a problem, let Du Pont show you how to blend these pigments.

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In addition, there's "Ti-Pure" R-100—a rutile with extremely low oil absorption, excellent grinding and suspension characteristics and good color. For interior paints, there are many Du Pont anatase grades, including "Ti-Pure" LO-CR, a pigment of excellent color and high gloss. Four Du Pont plants and twenty strategically located warehouses assure you of prompt, dependable deliveries.

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—the world's largest paint exposure area. Here, many types of exterior formulations are on display . . . with a careful record of performance to help you evaluate studies on all paint systems including acrylics, PVAc's and butadiene-styrenes. Call your Du Pont Representative today to set up a date for your visit. Or write: Du Pont, Pigments Department, Wilmington 98, Delaware.



WHITE AND COLOR PIGMENTS

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

SYNTHETIC RUBBER RESINS

in

TRAFFIC PAINTS

These resins can be dissolved readily in low cost solvents and can be formulated into fast drying and abrasion-resistant paints.

By
Russell H. Bellew*

IN 1930, a rubber resin with the trade mark name of Pliolite was placed on the market by The Goodyear Tire & Rubber Company. Because films formed by this new rubber resin were highly resistant to acids, alkalis, oils, greases, and moisture, the material soon was accepted for use in the paint industry.

The first Pliolite resin was a cyclized natural rubber. Then, with the advent of World War II and the shortage of natural rubber, Goodyear chemists developed a series of synthetic resins. One of these, Pliolite S-5, has been proven over the years to be far superior to natural rubber in the production of paints or other finishes.

Pliolite S-5 is a hard, thermoplastic, high styrene butadiene copolymer resin. Using it as the basic vehicle resin, traffic paints can be formulated to meet all the requirements of good highway striping materials.

Properties

The two most important requirements for highway marking materials are durability and visibility, and formulations based on this resin are superior in these properties. This resin can be dissolved readily in low cost industrial solvents and can be formulated into

fast drying and abrasion resistant traffic paints.

Pliolite VT is a newer member of this family of resins and is a vinyl toluene butadiene copolymer material developed specifically as a solution binder for coatings. Pliolite VT is also a thermoplastic resin, and like Pliolite S-5, forms films which are tough and chemical resistant. Its ready solubility in aliphatic solvents gives the material a distinct advantage over many conventional traffic paint binders.

Pliolite resins can be incorporated into traffic paints by the use of dispersion equipment common to the paint industry. Vehicle solutions of resins can be produced by a simple cold-cut or stir in method in advance of the pigment addition and milling operation. These resins do not have to be cooked or chemically converted to attain their excellent film properties.

Service Requirements

The service requirements for



More than 3,000 gallons of synthetic rubber traffic paints were used to mark crosswalks and traffic lanes in a number of Quebec, Canada cities during 1960. The paint was sprayed on to concrete and asphalt surfaces and must withstand weather extremes ranging from hot and humid to 30 degrees below zero.

*Chemical Div., Coatings Dept., The Goodyear Tire & Rubber Co., Akron, Ohio.

traffic paints are ease of application, fast dry, non-skinning, and non-settlement of pigments. Pliolite resins are adaptable for spray, brush or sled application. Traffic stripes should also wear away evenly or gradually erode so that recoating applications can be accomplished without undue surface preparation.

If spray or brush is to be used, then Pliolite S-5E or Pliolite VTL are recommended. For sled application the regular Pliolite S-5 or Pliolite VT should be used.

Traffic paints using Pliolite resins are fast drying since the film hardens as soon as the solvent is gone. Solvent evaporation drying is much quicker than oxidizing and polymerizing reactions which are required by other binders. Pliolite resin based traffic paints do not have a tendency to skin over in partly used containers.

Traffic paints should be formulated so as to be applicable to both asphalt and concrete road surfaces. They should have strong wetting action to penetrate the dirt and still have good adhesion. They should be able to withstand the chemical attack of alkalis in concrete and resist the bleeding of the asphalt on black-top roads. At the same time, they must be flexible enough to expand and contract with temperature changes and tough enough to withstand the abrasion of traffic. For all climate service, paints of this type should be sunlight and water resistant and permeable so as to allow moisture to escape from the substrate.

Fast drying traffic paints can be formulated by one or more of the following methods:

1. The proper selection of solvents has a large influence on the drying time of paints based on Pliolite resins. Table I shows that the drying time of the same basic paint formulation can be reduced from 21 to eight minutes by switching from V M & P naphtha to a 65/35 mixture of Tolu-Sol² and Benzo-Sol².
2. Modification of the vehicle to improve the solvent release properties but not affect the chemical resistance of the paint.
3. Modification of the pigment system. Laboratory tests indicate a possible correlation

between pigment particle size and dry time. Smaller particle sizes give faster dry times.

Inert Pigments

A laboratory investigation was made of the effect of different inert pigments on traffic paint durability. In our study, single inert paints were made at the same PVC (42.8%) by equal volume substitution. Of course, we realize that traffic paints will not be formulated with a single inert pigment but this gave a comparison of the inerts as this was the only variable since other ingredients were kept the same.

These paints were measured for dry time, Taber abrasion resistance, general appearance, cracking, dirt retention and chalking. Various calcium carbonates, talcs, diatomaceous silicas, china clays, zinc oxides and quartz silicas were included in this study.

Fastest drying was obtained with inerts under 6 microns in particle size. Moderate dry time was obtained with inerts between 6 and 10 microns in particle size. Diatomaceous silica gave the lowest weight losses on the Taber Abrader using a CS-17 wheel, 500 gram load, and 1000 cycles. Best outdoor durability was obtained with the paints containing talcs. The paints made with calcium carbonates exhibited the most dirt collection. The very small particle size inerts tended towards cracking on exposure.

Ultraviolet Degradation

Pliolite resins, like most organic binders, are oxidized by ultraviolet light, the result being ultimate degradation of the polymer through formation of hydroperoxides and then acidic and ketonic complexes.

This reaction is believed to be responsible for ultimate failure of paints on exposure.

There are several means of minimizing the effect of ultraviolet light on Pliolite resins. These are:

1. The use of ultraviolet absorbing pigments such as zinc oxide, china clay, silica or calcium carbonate.
2. The use of antioxidants and reducing agents such as Wingstay T¹, Calco 2246³ and Dyphos⁷.
3. Ultraviolet light absorbers such as Salol⁴ and Cyasorb 24³, or
4. The use of an epoxystearate such as Celluflex 21⁵ as part of the vehicle.

Glass Beads

Traffic paints reflectorized with glass beads require a thicker dried film and specific adhesion to glass and those based on Pliolite resins have very good bead retention. Glass beads not only improve the night visibility of the traffic stripe but also increase the service life. At night, the headlight beams are reflected from the many glass beads in the driver's range of vision, and the traffic stripes have a bright, glowing appearance.

In daylight, however, the light scattering effect of the beads gives the traffic marking a dull appearance when compared to a plain stripe. Since the glass beads project above the paint film and protect it from wheel contact, the beaded stripes have longer wear characteristics. Pliolite resin based traffic paints can be supplied with the beads mixed in or they can be dropped on the stripe just after the paint has been applied.

Many of the highway departments of the individual states have

Table I

Solvent System	ASTM Dry Time	Remarks
Benzo-Sol ²	14.3	Note 1
Tolu-Sol ²	13.7	Film Satisfactory
80 Benzo-Sol ² 20 Tolu-Sol ²	10.0	Note 2
90 Benzo-Sol ² 10 Toluene	13.5	Note 1
65 Tolu-Sol ² 35 Methyl Ethyl Ketone	8.0	Film Satisfactory
VM&P Naphtha (Control)	21.0	Film Satisfactory
Note: (1) Film skinned over and showed excessive pinholes.		
(2) Film showed excessive pinholes and surface roughness.		

traffic paint specifications based on Pliolite resins. These are for both white and yellow, beaded and non-beaded paints.

Exposure Results

We have received the report from Titanium Pigments Company of a seven month exposure test in the State of Pennsylvania. In this test, a traffic paint based on Pliolite VTL (formulation BX85J-67) outperformed Formulation MW-1758, a medium oil length alkyl. The Pliolite VTL based paint dried faster and also had better bead retention. Pictures of these stripes are shown in Figure 1 and Figure 2 and the formulation for this paint is given in Table II.

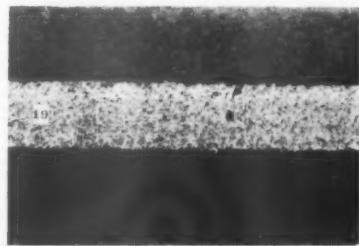
Pliolite based traffic paints have been in use by the Washington State Highway Commission, Department of Highways for a number of years. The formulations for the Yellow (G-32) and White (G-35) are given as percent by weight in Table III.

The paints shall contain the following materials which shall be proportioned to give the following composition in percentages by weight.

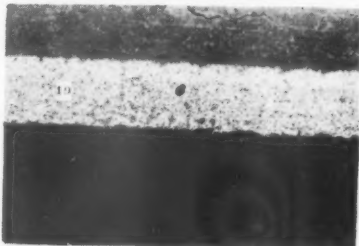
The City of Chicago, Illinois has and still uses traffic paints, based on Pliolite resins, manufactured by The Clinton Company.

As new Pliolite resins are developed, they constantly are being tested in traffic paints. Our test program is carried on with the highway departments in many states so that we will have paints on exposure under various climatic conditions and on many different

Figure 1. Paint #BX85J67
Exposure: 7 months
Surface: Concrete
Application: Spray (Beaded and Unbeaded)
Width of Line: 4 inches
Type of Marking: Longitudinal
Wet Film Thickness: 13 mils



Unbeaded. Rating—Entire Line: 5 (ASTM).
Open to traffic—50 minutes

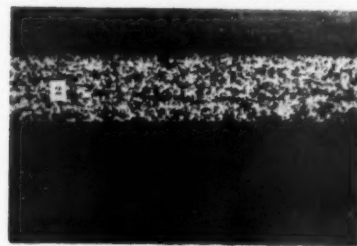


Beaded. Rating—Entire Line: 6 (ASTM).
Open to Traffic—50 minutes

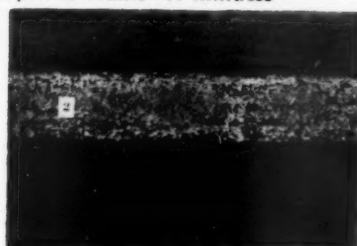
roadway surfaces. These paints are applied with regular marking equipment and regular crews, assuring objective test results.

Traffic paints made with Pliolite resins offer manufacturers the advantages of low cost raw material, easy and economical processing and good pigment wetting and suspension properties. Advantages of these paints are quick drying, tough, abrasion resistant films, good adhesion and bead retention, weather resistance, alkali resistant on concrete, bleed resistance on asphalt, non-skinning,

Figure 2. Paint #MW-1758
Exposure: 7 months
Surface: Concrete
Application: Spray (Beaded and Unbeaded)
Width of Line: 4 inches
Type of Marking: Longitudinal
Wet Film Thickness: 13 mils



Unbeaded Rating—Entire Line: 3 (ASTM).
Open to Traffic—77 minutes



Beaded. Rating—Entire Line: 4 (ASTM).
Open to Traffic—77 minutes

and excellent non-settling properties.

Acknowledgement

The writer gratefully acknowledges the assistance of the paint development section personnel of The Goodyear Tire & Rubber Co., Chemical Division, in the preparation of this article.

Raw Material Suppliers

1. The Goodyear Tire & Rubber Company, Akron, Ohio.
2. Shell Chemical Company, New York, New York.
3. American Cyanamid Company, New York, New York.
4. Eastman Chemical Products Inc., Kingsport, Tennessee.
5. Celanese Corporation of America, New York, New York.
6. Velsicol Chemical Corp., Chicago, Illinois.
7. National Lead Co., New York, New York.
8. E. I. DuPont de Nemours & Co., Inc., Wilmington, Delaware.
9. Thompson, Weinman & Co., New York, New York.
10. Sierra Talc & Clay Co., New York, New York.
11. American Zinc Sales Co., Columbus, Ohio.

Table II

Material	Lbs/100 Gallons
Pliolite VTL	91.0
Velsicol X-37 ⁶	91.0
Raw Soya Oil	18.0
Soya Lecithin	8.0
Di Acid Aluminum Stearate	8.0
Bentone 387	5.0
Tolu-Sol ²	284.0
Toluene	72.0
Ti-Pure FF ⁸	153.0
Lesamite ⁹	153.0
Fibrene C-400 ¹⁰	153.0
Zinc Oxide (Azo ZZZ-33) ¹¹	38.0
	1074.0

NV 67%; KU 60; PVC 44%; Approximate RMC \$1.37/Gallon.

Table III

Material	Formula G-32 (Yellow)	Formula G-35 (White)
*Titanium Dioxide Pigment)	0.0	15.8
*Calcium Sulfate Extender)	0.0	15.8
C P Medium Chrome Yellow	25.2	0.0
Diatomaceous Silica	2.4	1.9
Talc	23.4	18.3
Pumice	4.2	2.6
Resin	5.8	6.4
Pliolite S-5	5.8	6.4
Chlorinated Paraffin	4.5	5.0
Petroleum Solvent	18.2	18.0
Methyl Ethyl Ketone	9.8	9.0
Lecithin	0.7	0.8

*Note 3: The titanium dioxide pigment content and the calcium sulfate extender content shall be obtained by the use of a single manufactured pigment containing approximately 50% by weight of rutile titanium dioxide and 50% by weight of calcium sulfate or a blend of rutile titanium dioxide and a manufactured pigment containing approximately 30% by weight of rutile titanium dioxide and 70% by weight of calcium sulfate. The use of calcium sulfate as a separate pigment will not be permitted.



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fiable in a variety of systems and compatible with most resins and additives.

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BASIC TO AMERICA'S PROGRESS

Coating News From Hercules

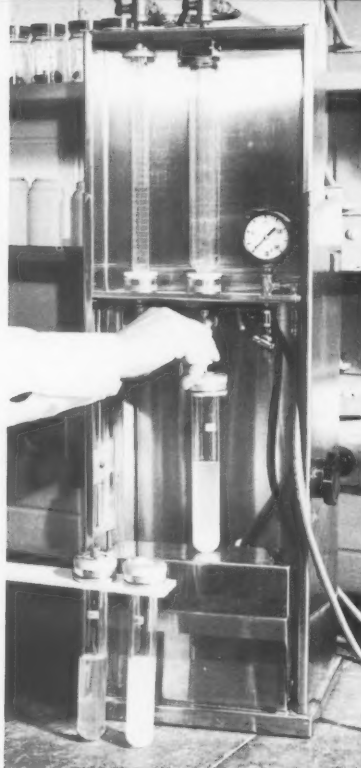


New standards for pavement markings set in 1961 manual—high-quality, fast-drying paints still needed for safest traffic control.

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OGRESS



What happens when a lacquer and an aerosol propellant are mixed in the invisible interior of a spray can? Will the mixture be storage-stable and yet atomize properly to give a fine, even spray? Some time ago, our coatings research group embarked on a detailed study of aerosol lacquers in order to assure lacquer manufacturers who use "Cubed"* nitrocellulose in their aerosol formulations that they could expect top performance from the final spray preparation.

The mysteries of the darkened aerosol container can now be explored by means of the following test method. A pressure test tube is filled with the lacquer to be examined. Fitted with an aerosol-type valve, the tube is then placed in a device called an "aerosol loader." This machine measures the exact amount of propellant

*Hercules Trademark

desired, then injects the liquid into the test tube through the valve. The reaction of propellant with the lacquer can be seen in a few minutes. If the mixture has been properly formulated, the solution will spray in the prescribed manner and the resultant finish is durable and attractive. Otherwise, an improper formulation will precipitate, or "kick out," and does not spray properly, if at all. Aerosol lacquer solutions are presently being tested in our laboratories and information obtained from the tests is available to you. We will be happy to furnish you with the latest facts. A call to your nearest Hercules Sales Office will keep you in touch.

Penton® coatings for corrosive environments are among the latest devel-



opments in the rapid growth of this new engineering material. Penton® is a chlorinated polyether plastic made by Hercules, which has won rapid acceptance for piping, valves, fittings, and tank linings in a wide variety of corrosive environments.

Heretofore, Penton could be applied as a solid in sheet form, as injection-molded parts, and as linings molded into steel bodies, or applied by fluidized-bed and similar techniques. Now, however, techniques have been worked out for deposit-

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Protective Coating News

ing fully divided Penton in thin primer coats from solution, followed by thick coats from solvent dispersions. The coats are sintered, or fused in place, after deposition.

Information on this new technique is available in two bulletins: Penton No. 8, "Penton Organic Dispersions and Solution Coatings," and Penton No. 9, "Special Methods for Applying Penton Coatings." The basic corrosion-resistant properties of Penton are described in the folder *The ABC's of Penton for Corrosion Resistance*, Form 500-320A, which gives recommendations for exposures to 391 different chemical environments. This information may be useful to you in connection with difficult corrosion conditions in your own or customer plants.

By fortunate coincidence, Hercules' current study on traffic paint variables, just completed, included four yellow formulations worked out with the knowledgeable assistance of Imperial Color experts. One of these was outstanding. To quote this report: "... one yellow (#77) conspicuously outperformed all other paints." For full details, ask for your copy of CSL-164, "Colored Parlon Traffic Paints—1960-61 Exposure Tests."

"R" for rapid is the designation for the fast-dissolving, nonionic water-thickener Natrosol® 250R just being introduced for thickening, suspending, and stabilizing in emulsion paint formulations. It gives the same smooth, sparkling clear solutions in either hot or cold water as the well-known Natrosol 250, but with new stir-in-and-use speed. Natrosol 250R is available in the broadest range of viscosities of any of the protective colloids on the market.

If you are working with emulsion paints of any type, and you do not already have samples of Natrosol 250HR or MR on hand, you will undoubtedly want to investigate these new materials.

"No-passing barrier lines must be yellow," says the 1961 Manual on Uniform Traffic Control Devices now being published by the U. S. Government Printing Office for the Joint Committee on Street and Highway Safety. This means that color is no longer optional, and a white traffic paint will no longer satisfy all demands. Yellow is prescribed for no-passing barrier lines, for double center lines on four-lane undivided pavements, and for curb painting in areas where parking is prohibited.





Twelve more students have just finished an intensive two-week course at Hercules' fourth Alkyd School. Their course of study covered the design of alkyd resins and polyesters from the laboratory, through pilot plant preparations, and into commercial production units. The course, given at the Applications Laboratory in the Hercules Research Center, was conducted by Hercules research personnel

supplemented by guest lecturers selected as authorities in their specified fields.

Hercules is a primary producer of Pamak® Tall Oil Fatty Acids and Improved Technical PE — important raw materials for resins. This session of the Alkyd School was a continuation of our service in alkyd technology to the coatings industry.

Where to buy it — In all industrial activity, sources of supply tend to become categorically familiar. Yet often interest in a new field, or in a new material, can introduce new problems. Then it is helpful to have at hand a complete listing of alkyds and resins

Cellolyn®, Pentalyne®, and Neolyn® resins; ester gums and rosin esters; special resins such as Hercolyn® D and Abitol®.

film-formers

Nitrocellulose, ethyl cellulose, EHEC, Parlon® chlorinated rubber.

pigment colors

Imperial Color Chemical & Paper Department offers a line of over 1,500 standard pigment colors.

plasticizers and lubricants

Hercoflex® plasticizers, special plasticizing resins, and the Hercolube® lubricants.

polyols

Hercules® Improved Technical PE, Mono-PE, Di-PE, and PE-200.

reactive chemicals

Acetic anhydride, *a*-methylstyrene, cumene

and other hydroperoxides and peroxides for catalysts, DMT (dimethyl terephthalate), MpT (methyl-para-toluate), monochloroacetic acid, para-cresol, phenol, urea solutions and UF concentrates.

rosins and rosin modifications

Pale wood rosins; Polypale®, Staybelite®, and Dymecex® resins; Resin 731*^D; Lined Poly-pale resin.

solvents

Acetone, Dipentene No. 122®, Yarmor® pine oils, Solvenol®, Hercules® Steam-Distilled Wood Turpentine.

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Pamak® tall oil fatty acids are made in a number of grades with different rosin contents.

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EVALUATION OF TEST TRAFFIC MARKING PAINTS

An approach to the formulation of traffic paint
vehicle systems based on hydrocarbon resins.

By
Andrew Schor*

REVIEWING the traffic paint specifications issued by forty-six of our states discloses that these specifications can be classified into two broad groups. The first group is comprised of those specifications which detail the formulation for vehicle and pigment systems which the bidder is required to follow. The second group of specifications does not specify a particular vehicle system, but does describe field performance evaluations and ratings which form the basis for competitive consideration of the candidate traffic paints.

Of the forty-six states, twenty-seven specify vehicle systems for one or more of their traffic paints; the other nineteen base their purchasing program on a program of field evaluations. In Table I, a summary is given of the vehicles as specified by the states for the four different color traffic paints.

Many vehicle formulations are known and available that can be judged to have a reasonable expectancy for successful performance in traffic paint utilization. The purpose of this paper is to provide laboratory data covering one approach to the formulation of traffic paint vehicle systems.

Test Program

The Velsicol Chemical Corpora-

Table I — Vehicles Specified for Traffic Paint Color				
Vehicle	White	Yellow	Red	Black
Alkyd Resin	17	15	—	—
Alkyd Resin plus chlorinated rubber resin	1	—	—	1
Modified phenolic resin oleoresinous varnish	2	2	—	—
Modified phenolic varnish plus dispersion resin	3	2	—	—
Chlorinated rubber resin plus modified rosin ester varnish	3	1	1	—
Styrene-butadiene resin plus chlorinated biphenyl resin	1	1	—	1
Styrene-butadiene resin plus hydrocarbon resin plus chlorinated paraffin	1	1	—	—
Field performance tests — no vehicle specified	19	16	—	—

tion in a cooperative effort with a leading midwestern research institution carried out a laboratory program evaluating a number of test traffic paint formulations incorporating hydrocarbon resins in the vehicle system. The purpose of the program was to investigate and determine the effects and/or contributions of certain select types of hydrocarbon resins in specific vehicle systems. Information gained in this program would then lead to optimum formulations which could then be submitted for large scale field tests.

In this program, the vehicle systems included vinyl toluene resin-chlorinated paraffin, chlorinated rubber resin-oleoresinous varnish and chlorinated rubber resin-alkyd resin vehicle. In designing the program, hydrocarbon resins were selected, which on the basis of their chemical properties would be

expected to impart intrinsic contributions to the specific vehicle system. Four Velsicol Resins: X-30, X-37, AD-21, and WX-561 were used in this program.

Two of the hydrocarbon resins, Velsicol X-30 and X-37 are structurally aromatic type thermoplastic resins. As evidenced by the perbenzoic acid values, both of these resins have a low degree of unsaturation. The aromatic structure enhances compatibility characteristics particularly with styrene-butadiene and vinyl toluene copolymer resins. Film studies of Velsicol X-30 and X-37 have shown that these resins air dry entirely by solvent evaporation and that they display good solvent release. Both resins are light in color and impart water and alkali resistance. Velsicol X-30 and X-37 resin modifications in a representative long oil alkyd solution were evaluated.

*Manager, Industrial Sales Div., Velsicol Chemical Corp., Chicago, Ill.

Table II — Reactivity Comparison

Resin	Drying Oil	Gallon Length	Cooking Time*	Air Dry Set to Touch**	Air Dry Foil Free***
WX-561	Tung	12½	2.1 hrs.	0.25 hrs.	0.30 hrs.
Rosin Modified Phenolic	Tung	12½	1.3 hrs.	0.30 hrs.	0.75 hrs.
Oil Soluble Phenolic	Tung	12½	0.6 hrs.	0.20 hrs.	0.50 hrs.
WX-561	Tung	25	1.5 hrs.	0.40 hrs.	1.0 hrs.
Rosin Modified Phenolic	Tung	25	1.2 hrs.	0.40 hrs.	2.3 hrs.
Oil Soluble Phenolic	Tung	25	0.65 hrs.	0.50 hrs.	2.3 hrs.
WX-561	DCO	12½	3.6 hrs.	0.25 hrs.	0.30 hrs.
Rosin Modified Phenolic	DCO	12½	4.5 hrs.	0.30 hrs.	24 hrs.
WX-561	DCO	25	4.0 hrs.	0.60 hrs.	24 hrs.
Rosin Modified Phenolic	DCO	25	5.4 hrs.	0.75 hrs.	24 hrs.

*Cooking time required to attain a varnish viscosity of G-H at 50% solids in xylene tung oil varnishes cooked at 450°F. Dehydrated castor oil varnishes cooked at 550°F.

**Air dry rates were determined on aged drier mixes containing 0.2% lead and 0.2% cobalt materials with 1% anti-skinning agent based on total vehicle solids. 3 mil films were applied to glass panels with a Bird Applicator.

***Set time was judged by no-film pick up upon light fingered touch; foil free time as the point when aluminum foil could be applied and removed from the film without noticeable pull.

Both of these resins, Velsicol X-30 and X-37, were tested in the vinyl toluene resin — chlorinated paraffin vehicle system and in the chlorinated rubber — alkyd combination.

Velsicol AD-21 and WX-561 are unsaturated resins differing in their relative degree of unsaturation. Velsicol WX-561 is classified as highly unsaturated resin. Both resins display marked reactivity properties with drying oils in the formulation of oleoresinous varnishes. This property results in the contribution of improved air drying rates. Table II is presented to

summarize the heat reactivity characteristics of Velsicol WX-561 in oleoresinous varnishes.

The characteristics of WX-561 oleoresinous varnishes were considered of sufficient interest to warrant evaluations in traffic paint vehicle systems employing oleoresinous binders as components. Velsicol AD-21 varnishes were included in the study to measure the comparative effects of high resin unsaturation vs. moderate resin unsaturation.

Formulation

Table III describes the formula-

tion of five test paints based on a vehicle system composed of vinyl toluene-butadiene resin plus chlorinated paraffin plasticizer. Test Paints #1 and #2 are suggested by Goodyear Chemical Company as per their formulations #GM-154-11 and GM-154-14. These two paints differ only in the ratio of Pliolite VT to Velsicol X-37. In test paint #3, 50% of the chlorinated paraffin (as contained in test paint #2) was replaced on an equal weight basis with equal parts of Pliolite VT and Velsicol X-37. In test paint #4, as compared to test paint #3, the Velsicol X-37 was replaced by the lower melting point Velsicol X-30. In test paint #5, as compared to test paint #3, all of the chlorinated paraffin and the Velsicol X-37 was replaced by Velsicol X-30. It will be noted that all of the Test Paints have comparable weights per gallon, vehicle solids, and PVC's. The variations in vehicle components in the five test paints were studied to determine changes in air dry time, no pick up time, and abrasion resistance.

Table VI records the laboratory evaluation of these five test paints. The air dry time was determined with the Gardner Drying Time Recorder and the "No Pick Up" times were determined in accord-

Table III — Test Traffic Paint Formulations

Raw Material Component (By Weight)	Vinyl Toluene-Butadiene Resin Extension with Thermoplastic Aromatic Hydrocarbon Resin				
	Test Paint* #1	Test Paint** #2	Test Paint #3	Test Paint #4	Test Paint #5
Ti Pure R-610	12.50	12.50	12.50	12.50	12.50
Lesamite Whiting	27.60	27.60	27.60	27.60	27.60
ASP-100 Clay	6.30	6.30	6.30	6.30	6.30
Celite 266	4.90	4.90	4.90	4.90	4.90
Aluminum Stearate	.90	.90	.90	.90	.90
Soya Lecithin	.90	.90	.90	.90	.90
Pliolite® VT	9.20	6.10	7.30	7.30	7.30
Chlorowax® 40	4.50	4.70	2.30	2.30	—
Velsicol X-37	3.20	6.10	7.30	—	—
Velsicol X-30	—	—	—	7.30	9.60
Lactol® Spirits	30.00	30.00	30.00	30.00	30.00
Total	100.00	100.00	100.00	100.00	100.00
Properties:					
Wt. Per Gal., lbs.	11.15	11.13	11.18	11.19	11.21
PVC, %	53.1	53.2	53.1	53.1	53.0
Viscosity, KU	66	59	69	67	70
Non-Volatile, %	70	70	70	70	70
Pliolite VT: Chlorowax 40:					
Hydrocarbon Resin Ratio	2.88/1.43/1.0	1.0/0.78/1.0	1.0/0.33/1.00	1.0/0.33/1.00	.75/0.0/1
Pigment:Binder	3.1:1	3.1:1	3.1:1	3.1:1	3.1:1

*Formulation as per Goodyear Chemical #GM-154-11

**Formulation as per Goodyear Chemical #GM-154-14

ance with ASTM D-711-55 procedure. Abrasion resistance was determined for each paint after drying times of 24 hours, 1 week, and 1 month. It will be noted that abrasion resistance tests were conducted on both unbeaded as well as beaded films. The beaded paints were prepared in each case by premixing Prismo S-45 glass beads with the paints at the rate of 4 lbs. of beads per gallon of paint. The abrasion resistance tests were conducted using a Taber Abraser, using rubber wheels on the beaded films and CS17 wheels on the unbeaded films. The results are reported as weight loss in grams after 500 cycles of the Taber Abraser. (This same procedure is followed in all subsequent film evaluations).

The data given in Table IV shows that with the chlorinated paraffin content held constant, the drying times of the paints increased as the Velsicol X-37 content is increased. (test paint #2 as compared to test paint #1). However, if the amount of chlorinated paraffin was decreased, the content of Velsicol X-37 could be increased (while maintaining the same Velsicol X-37/Pliolite VT ratio) without an increase in air dry times. The same degree of abrasion resistance is maintained. The same relationship was observed in the case where Velsicol X-30 was substituted for Velsicol X-37. The latter observation indicates that a difference in softening point of some 20°F. in a modifying resin would not contribute any substantial changes in the air drying rates. In test paint #5 the chlorinated paraffin is omitted completely and a decrease in air drying rate is noted. Except for test paint #5 (unbeaded films) the abrasion resistance for each of the test paints appears to be comparable.

In Table V test paint formulations are described in which four different oleoresinous vehicles are used to modify a chlorinated rubber resin. Three of the varnishes are prepared with three different hydrocarbon resins having a varying degree of unsaturation and oil reactivity. The fourth varnish is one prepared from a phenolic modified rosin ester. All of the varnishes were prepared in the same manner using 100 parts of resin

with 200 parts of tung oil. In the cooking procedure, the resin and the oil were heated to 400°F. in one hour. The cook was held at 400°F. for 2 hours and 20 minutes, after which the varnish was cooled and thinned to 50% solids with a solvent blend consisting of 188 parts by weight of toluene and 112 parts by weight of hexane. The drier combination consisted of 5 parts of lead naphthenate (24% lead) and 2.3 parts by weight of cobalt naphthenate (6% cobalt). test

paints 5, 7, 8 and 9 were all at comparable viscosities, non-volatile content and PVC levels.

Results

In Table VI, the data applying to the laboratory evaluation of these four test paints is presented. It will be noted that test paint 7 required the longest time both to reach the no pick up time and for air drying as determined by the Gardner Drying Time Recorder. The oleoresinous vehicle used in test paint 7 contains Velsicol X-30 as

Table IV — Laboratory Evaluation, Test Traffic Paint Formulations, Vinyl Toluene-Butadiene Resin Extensions

Laboratory Test	Test Paint #1	Test Paint #2	Test Paint #3	Test Paint #4	Test Paint #5
Drying Time, Minutes (Gardner Drying Time Recorder)	14.5	22.0	17.5	15.0	11.0
No Pick up Time Minutes (ASTM D711-55)	55.0	70.0	52.5	57.5	44.0
Abrasion Resistance (Taber Abraser), wt. loss in grams:					
Unbeaded Films —					
24 hr. dry	0.0313	0.0213	0.0517	0.0423	0.0748
1 wk. dry	0.0370	0.0347	0.0329	0.0369	0.0537
1 month dry	0.0344	0.0366	0.0444	0.0507	0.0555
Beaded Films —					
24 hr. dry	0.0042	0.0034	0.0040	0.0036	0.0039
1 wk. dry	0.0016	0.0009	0.0015	0.0012	0.0022
1 month dry	0.0054	0.0016	0.0062	0.0057	0.0149

Table V — Test Traffic Paint Formulations Chlorinated Rubber — Oleoresinous Vehicle

Component	Test Paint #6 Parts by wt.	Test Paint #7 Parts by wt.	Test Paint #8 Parts by wt.	Test Paint #9 Parts by wt.
Ti Cal R-22	49.20	49.20	49.20	49.20
Nytal 300	6.10	6.10	6.10	6.10
Lesamite Whiting	6.10	6.10	6.10	6.10
Soya Lecithin	.64	.64	.64	.64
Parlon® (10 cps.)	3.20	3.20	3.20	3.20
25 Gal. Length Velsicol AD-21/Tung Varnish (50% Solids)	25.6	—	—	—
25 Gal. Length Velsicol X-30/Tung Varnish (50% Solids)	—	25.6	—	—
25 Gal. Length Velsicol WX-561/Tung Varnish (50% Solids)	—	—	25.6	—
25 Gal. Length Pentalyn® 802A/Tung Varnish (50% Solids)	—	—	—	25.6
Toluene	4.20	4.20	4.20	4.20
Benzene	4.90	4.90	4.90	4.90
Epichlorohydrin	.06	.06	.06	.06
Total	100.00	100.00	100.00	100.00
Properties:				
Wt. Per Gal., lbs.	13.3	13.3	13.4	13.4
Non-Volatile %	78	78	78	78
Viscosity K.U.	74	72	77	76
PVC, T	55	55	55	54
Pigment:Binder	3.8:1	3.8:1	3.8:1	3.8:1

the resinous component. This resin has the least amount of unsaturation and the least drying oil reactivity. In test paint 6 the oleoresinous vehicle contains a hydrocarbon resin of intermediate unsaturation. Improvement in air drying rate was noted. A similar trend is noted in test paint 8 where

a highly unsaturated hydrocarbon resin, Velsicol WX-561 is used in the oleoresinous varnish. These data tend to indicate the desirability of utilizing a hydrocarbon resin having high heat reactive properties in the modifying varnish. In addition, the abrasion resistance of the beaded films using this type

of extension appear to be noteworthy also.

In a final series of tests, traffic paint formulations were evaluated in which a hydrocarbon resin was used to extend a chlorinated rubber resin in a vehicle system consisting of chlorinated rubber resin plus alkyd resin. The formulation is given in Table VII with the evaluation data presented in Table VIII. It was found in these tests, that the substitution of 50% of chlorinated rubber resin by Velsicol X-37 increased both the no pick up time and the drying time. The abrasion resistance results for both traffic paints, beaded and unbeaded, are comparable for the same film dry periods.

The laboratory program, as described, provides data indicative of the performance to be anticipated in use of specific generic types of hydrocarbon resins in vehicles for traffic paint. In the vinyl toluene-butadiene resin vehicle systems, a thermoplastic hydrocarbon resin having an aromatic structure functions as an extender for the resin/plasticizer system and contributes to both the abrasion resistance and to the rate of air dry.

Laboratory evaluations of test traffic paints based on a chlorinated rubber resin-oleoresinous vehicle system showed that the optimum results, in the case of hydrocarbon resin utilization, could be attained with a high melting point, strongly heat reactive hydrocarbon resin. This series of tests was particularly informative in that very marked improvements in air dry rate could be noted together with an acceptable degree of abrasion resistance. As a result of this program, test paints #1, #3, #4, #8 and #10 are considered of sufficient merit and value to justify practical testing on a field scale.

Table VI — Laboratory Evaluations — Test Traffic Paint Formulations (Chlorinated Rubber — Oleoresinous Vehicles)

Test	Test Paint #6	Test Paint #7	Test Paint #8	Test Paint #9
Drying Time, Minutes, (Gardner Drying Time Recorder)	38	55	20	27
No Pick Up Time, Minutes (ASTM D711-55)	37	55	9	11
Abrasion Resistance, Wt. loss in grams, after 500 cycles, (Taber Abraser)				
Unbeaded:				
24 hrs. dry	0.0357	0.0294	0.0477	0.0717
1 wk. dry	0.0285	0.0194	0.0598	0.0337
1 month dry	0.0170	0.0221	0.0328	0.0471
Beaded:				
24 hr. dry	0.0116	0.0037	0.0007	0.0010
1 wk. dry	0.0008	0.0006	0.0010	0.0008
1 month dry	0.0033	0.0020	0.0009	0.0024

Table VII — Test Traffic Paint Resin Formulations Chlorinated Rubber/Alkyd Combinations Extended with Hydrocarbon Resins

Ingredient	Test Paint #10	Test Paint #11
Titanox C-50	39.00	39.00
Lesamite Whiting	16.40	16.40
Thixcin	.20	.20
Alkyd Resin (60% Solids)	27.10	27.10
Parlon® S10 (50% in toluene)	3.60	1.80
Lead Naphthenate (24% Pb)	.77	.77
Cobalt Naphthenate (6% Co)	.20	.20
Toluene	12.60	12.60
Epichlorohydrin	.08	.08
Anti-skinning agent	.05	.05
Velsicol X-37 (50% in toluene)	—	1.80
Total	100.00	100.00
Properties:		
Wt. Per Gal., lbs.	13.2	13.1
PVC, %	56.0	56.1
Non-Volatile %	73	73
Viscosity, K.U.	76	72

Table VIII — Laboratory Evaluations — Test Traffic Paint Formulations, Chlorinated Rubber/Alkyd Combination Extended with Hydrocarbon Resin

Laboratory Test	Test Paint #10	Test Paint #11
Drying Time, Minutes	9.25	13.0
No Pick Up Time, Minutes	27.0	44.0
Abrasion Resistance (wt. loss in grams)		
Unbeaded:		
24 hour dry	0.0339	0.0254
1 wk. dry	0.0205	0.0193
1 month dry	0.0292	0.0296
Beaded:		
24 hour dry	0.0012	0.0016
1 wk. dry	0.0009	0.0007
1 month dry	0.0013	0.0012

Trademark References

Ti Cal	E. I. DuPont de Nemours & Co.
Ti Pure	E. I. DuPont de Nemours & Co.
Lesamite	Thompson-Weiman & Co.
ASP-100 Clay	Minerals & Chemical Philipps
Celite	Johns-Manville Corp.
Pliolite	Goodyear Chemical Co.
Chlorowax	Diamond Alkali
Pentalyn	Hercules Powder Co.
Parlon	Hercules Powder Co.
Nytal	R. T. Vanderbilt
Titanox	Titanium Pigments
Thixcin	Baker Castor Oil Co.
Albalith 11	New Jersey Zinc
Asbestine	International Talc
Lactol Spirits	American Mineral Spirits
Prismo	Prismo Safety Corp.
Velsicol	Velsicol Chemical Corp.

*A report on nation-wide
tests of latex- and
oil-base house paints*

See for
yourself
what a
difference
zinc pigments
make



SEE THE DIFFERENCE IN LATEX-BASE PAINTS

with ZnO

without ZnO

CEDAR SIDING



ON THE COVER

Proof of Zinc Pigments' Importance to Tint Retention in Exterior Pastels

The top panels in each of the six color sets shown on the previous page exhibit greater tint retention, clarity and cleanliness. Yet all panels were exposed to identical conditions for over 2 years in South-vertical positions at Palmerton, Pa.

Why did the top panels retain so much more color? Because they're painted with oil base pastels containing zinc pigments. This provides a "parasol" effect that protects the pastels from ultra-violet color deterioration.

The left half of each panel was primed with a special zinc-free primer—right halves were self-primed. Accordingly bottom panels received no zinc pigments.

The cedar shakes spread at the bottom show the tint retention also available in latex exterior paints that contain zinc oxide. The paint used on the faded shakes contained no zinc oxide.

...in tint retention

The photos on these 4 pages are unretouched—taken of test panels exactly as they were removed from exposure locations throughout the U.S.A.

Together they dramatically prove the ability of zinc pigments to improve house paint formulations by contributing greater tint retention, opacity to ultra-violet light

...and in improvement over

All three panels at the right were exposed to identical conditions in South Florida for one year. The left half of each was painted with a special oil base primer and the right half was self-primed. The top panel was then painted with latex base paint containing zinc pigment. The center and bottom panels were then painted with zinc-free latex base formulations as recommended by two leading resin emulsion manufacturers. You can see the advantage of having zinc pigments in the formulation.

with ZnO

without ZnO

with ZnO

without ZnO

CEDAR SHAKES

CEMENT SHINGLES

retention and mildew resistance

mildew resistance, and self-cleaning action. A reasonable level of zinc pigment per gallon of paint also provides increased durability, mold control, tannin-stain resistance, control of chalking, and as much as 25 to 45% greater hiding power.

All three of the substrates (above) were coated with latex paints formulated with

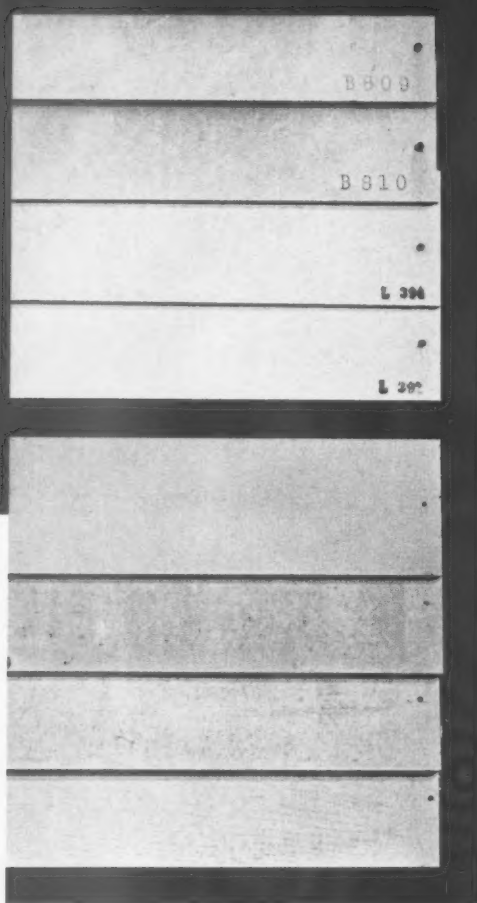
National Resin 2S-2243—both with and without zinc pigments.

The panels below demonstrate comparative results with leading manufacturers' "zinc-free formulations." All panels had been exposed for over a year. As you can see, the latex paints containing zinc pigments proved better in every case.

over recommended "substitute" formulations, too!



Turn the page to see
how zinc pigments
provide greater resistance to mildew
**IN OIL-BASE
PAINTS**



See for yourself what a difference zinc pigment makes in resistance to mildew

These panels were exposed at New Orleans, La.—where mildew is “murder.” Each panel received two coats of an alkyd modified oil base paint. Only the bottom two white panels and the top yellow panel received zinc oxide.

The other panels received varying amounts of other pigment types of commercial mildew control agents. You can see for yourself what a difference zinc pigment's fungistatic properties made in keeping paint coats free of mildew.

The American Zinc Institute continually acquires new data on the use of zinc pigments in paint formulations. A large part of this data is the result of extensive evaluation programs carried on by AZI and its members. All data is readily available to paint formulators. For additional information or copies of any of the following technical articles, write to the American Zinc Institute.

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“Zinc Pigments in Exterior House Paints,” American Zinc Institute Panel.

“Hiding Power of Zinc Pigments in House Paints” by Clovis Adams.



AMERICAN ZINC INSTITUTE, INC.

292 Madison Avenue, New York 17, N. Y.

CHLORINATED RUBBER AND ALKYD TRAFFIC PAINTS

HERCULES Powder Company has conducted extensive laboratory and road tests on traffic paints, over a three-year period. The object of this study was to develop a formulation having optimum performance with respect to fast drying speeds and durability under traffic wear—the two characteristics most desired in a traffic paint.

According to Hercules, the main requirements of a good traffic paint are:

1. Easy application characteristics with standard road sprayers.
2. Quick dry to no-pickup stage.
3. Long life on concrete and asphalt roadways.
4. No bleeding on tar or asphalt.
5. Good visibility, both day and night.

Formulation

The test paints used the pigmentation specified by the New Jersey Highway Department, which is composed of 80% titanium-calcium pigment, 10% magnesium silicate, and 10% calcium carbonate. Vehicles were blends of Parlon (chlorinated rubber) and varnish, or chlorinated rubber and drying alkyd.

The following variables were included in this study:

1. Pigment-volume concentration (P. V. C.)

Ingredients	Formulations ⁽¹⁾							
	1	2	3	4	5	6	7	8
Parlon® S10	4.6	4.6	4.6	4.0	9.4	4.0	4.0	-
56% Soybean-glycerin alkyd	-	-	-	16.0	-	-	-	20.0
65% Soybean-glycerin alkyd	-	18.5	-	-	-	-	-	-
65% Soybean-PE alkyd	18.5	-	-	-	-	-	-	-
70% Pamak® 4-PE alkyd	-	-	18.5	-	-	-	-	-
25-Gal. Pentalyn® 802A-tung oil varnish	-	-	-	-	13.6	16.0	-	-
30-Gal. Panarez 6-210-tung oil varnish	-	-	-	-	-	-	16.0	-
Clorafin® 40	-	-	-	-	4.0	-	-	-
Titanium-calcium pigment	61.7	61.7	61.7	64.0	-	64.0	64.0	64.0
Asbestine 3X	7.6	7.6	7.6	8.0	7.8	8.0	8.0	8.0
Keystone whitening	7.6	7.6	7.6	8.0	27.4	8.0	8.0	8.0
Titanium oxide, rutile	-	-	-	-	19.0	-	-	-
Mica	-	-	-	-	7.8	-	-	-
Celite 110	-	-	-	-	11.0	-	-	-
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Performance								
P. V. C.	55	55	55	59	53	59	59	59
Nonvolatile ⁽²⁾ , %	73	72	73	74	64	77	76	72
No-pickup time, minutes ⁽³⁾	16	20	17	13	18	12	14	32
Durability, 7 months ⁽⁴⁾								
Concrete, 12,000 cars per day	87	96*	76	-	87*	75	-	80
Asphalt, 6,000 cars per day	-	-	-	94	93	92	95	88*
								(unbeaded)
Concrete, 6,000 cars per day	-	-	-	93	91	83	93	-
Viscosity, K. U.	68	70	69	72	74	78	74	72

(1) All paints contained 0.1% of 6% cobalt naphthenate, 0.1% epichlorohydrin, and 0.1% ASKA (Advance Solvents)

(2) Toluene used as solvent in 1-7; mineral spirits used in 8

(3) ASTM D711-55

(4) % of line remaining; ASTM D913-51

*6 months only (1957-1958 series).

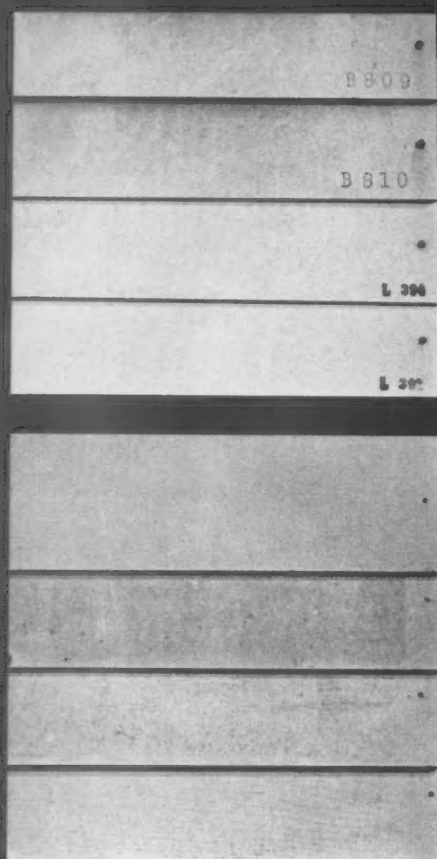
2. Soybean alkyds of various lengths.
3. Tall oil alkyds of various lengths.
4. Glycerin versus PE alkyd polyol.
5. Tung oil varnishes based on Pentalyn and hydrocarbon-type resins.

Composition and performance data of seven promising chlorinated

rubber-modified paints, plus a high-grade alkyd traffic paint are listed in Table I.

Testing showed that all of these handled well in standard road sprayers, gave no bleeding problems on asphalt surfaces, and had adequate night visibility when glass spheres were "dropped in" the freshly sprayed film.

It was found that chlorinated



See for yourself what a difference zinc pigment makes in resistance to mildew

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The test paints used the pigmentation specified by the New Jersey Highway Department, which is composed of 80% titanium-calcium pigment, 10% magnesium silicate, and 10% calcium carbonate. Vehicles were blends of Parlon (chlorinated rubber) and varnish, or chlorinated rubber and drying alkyd.

The following variables were included in this study:

1. Pigment-volume concentration (P.V.C.)

TABLE I

FORMULATION AND PERFORMANCE OF TRAFFIC PAINTS

Ingredients	Formulations (1)							
	1	2	3	4	5	6	7	8
Parlon® S10	4.6	4.6	4.6	4.0	9.4	4.0	4.0	-
56% Soybean-glycerin alkyd	-	-	-	16.0	-	-	-	20.0
65% Soybean-glycerin alkyd	-	18.5	-	-	-	-	-	-
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Titanium oxide, rutile	-	-	-	-	19.0	-	-	-
Mica	-	-	-	-	7.8	-	-	-
Celite 110	-	-	-	-	11.0	-	-	-
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Performance								
P.V.C.	55	55	55	59	53	59	59	59
Nonvolatile (2), %	73	72	73	74	64	77	76	72
No-pickup time, minutes (3)	16	20	17	13	18	12	14	32
Durability, 7 months (4)								
Concrete, 12,000 cars per day	87	96*	76	-	87*	75	-	80
Asphalt, 6,000 cars per day	-	-	-	94	93	92	95	88*
								(unbeaded)
Concrete, 6,000 cars per day	-	-	-	93	91	83	93	-
Viscosity, K.U.	68	70	69	72	74	78	74	72

(1) All paints contained 0.1% of 6% cobalt naphthenate, 0.1% epichlorohydrin, and 0.1% ASKA (Advance Solvents)

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It was found that chlorinated



Type 3 paint being applied to the center stripe on U. S. 130 at the Bordentown, New Jersey test area.

rubber modified paints were outstanding in drying speed, reaching the no-pickup stage in 12-20 minutes. This is about half the time required by the all-alkyd type. Best overall performances were shown in Formulations 1 and 2, which use chlorinated rubber and 65% soybean oil-PE alkyd in one case and chlorinated rubber and 65% soybean oil-glycerin alkyd in the other case, at 55% P. V. C.

Colored Traffic Paints

Recently Hercules Powder evaluated several chlorinated rubber traffic paints in which the vehicle was a Parlon—65% soybean-PE alkyd.

Since the use of special colors has recently been recognized as an effective method of traffic control, several colored traffic paints based on the most durable vehicle (Parlon-65% soybean-PE alkyd) were evaluated. One blue and one green traffic paint were compared for durability and night visibility against a control, which was standard white.

Beaded and unbeaded lines were evaluated on both concrete and asphalt. The total traffic count was 16,800 vehicles per day (8,400 per lane), of which 53% were trucks. To add to the severity of the exposure, the test extended from June 5, 1960 to February 20, 1961, including normal traffic flow during the most severe winter in recent history.

The colored traffic paints were quite durable, and based on these results, Hercules feels that only slight modification would be necessary to obtain a high performance, commercial, colored striping material. The green line proved to be

much too dark for good day or night visibility, indicating that a reduction in the amount of colored pigment is required. The blue traffic paint appeared satisfactory in all respects and was rated as slightly more durable than the control line.

With regard to colored traffic paints, yellow is to be looked at objectively by states in view of the fact that interstate highway programs continue to specify this color for center-lining four lane roads with no barrier or median strip.

In the course of this program, Hercules evaluated Parlon P (chlorinated polypropylene) as a vehicle for traffic paints. While this paint proved to be very durable, it showed signs of incompatibility when sprayed, requiring a great deal of attention to obtain a continuous paint film. Hercules hopes to correct this problem by re-formulation, including the use of suitable resins with which Parlon P has better compatibility and inclusion of plasticizers as coupling agents.

Alkyd Type

One of the current traffic specifications, both state and federal, requires the use of a medium phthalic soya type alkyd, reduced in a fast evaporating solvent such as VM&P naphtha.

In this connection, Reichhold Chemicals, in a cooperative program with the State of New Jersey Highway Department, has helped to develop a very fast drying traffic paint that could be controlled, both for performance and composition. Based on numerous test lining evaluations, the State of New Jersey Highway Department adopted

Table II
REQUIREMENTS OF
STATE OF NEW JERSEY
WHITE TRAFFIC PAINT—TYPE III

Composition:	Min.	Max.
PAINT—% by weight		
Pigment.....	57.0	59.0
Vehicle.....	41.0	43.0
Weight per Gallon.....	13.2	—
PIGMENT—% by weight of Total Pigment		
Calcium Base Titanium Dioxide.....	80.0	80.2
Magnesium Silicate....	9.0	11.0
Calcium Carbonate....	9.0	11.0
Non-Volatile Vehicle..	42.0	—
VEHICLE—% by weight		
Isolated Vehicle Solids:		
Alkyd.....	80.0	—
Chlorinated Rubber..	20.0	—

an alkyd-chlorinated rubber combination known as the Type 3 Traffic Paint (See Table II for formulations). This type of traffic paint dries to a "no traffic pick-up" in a maximum of fifteen minutes and, in average applications, in approximately seven minutes.

One alkyd which has shown promise in Type 3 system is P-819-60 Beckosol. According to Reichhold, this vehicle has excellent compatibility with chlorinated rubber.

In the New Jersey Type 3 (Table III) Traffic Paint, experimental testing has shown P-819-60 Beckosol to perform very satisfactorily. Reichhold claims that this paint has high drying speed, abrasion resistance, weather resistance and flexibility. While based solely on an aromatic solvent system, the choice of solvents in the paint are of such a volatility rate that the preparation can be successfully applied to blacktop without danger of bleed-through from this type of surface material.

Table III
STATE OF NEW JERSEY
WHITE TRAFFIC PAINT—TYPE III
Lbs./100 Gals.

Titanox RCHT.....	600.0
Asbestine 3X.....	75.0
Snowflake Whiting.....	80.0
Soya Lecithin.....	7.5
P-819-60 Beckosol.....	310.0
Benzol.....	131.0
Grind in Pebble Mill	
40% Solution 10 Cps. Parlon in Benzol.....	116.5
6% Cobalt Naphthenate....	1.4
24% Lead Naphthenate.....	2.8
Anti-Skinning Agent.....	1.0
Initial Viscosity.....	75 K.U.

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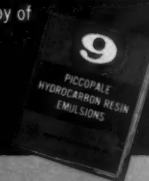
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CHEMICALS

HIGHWAY EDGELINING CUTS DOWN ACCIDENTS

Edgelining of a two-lane road means an additional 34 gallons of paint per mile.

IN 46 of the 50 states, highway departments are painting white guide lines along the edges of roads and sprinkling them with tiny glass beads so they shine brilliantly at night under the headlights of passing cars. The fact that the lines add a neat, trim touch is more or less incidental, although this has undoubtedly helped to make edgelining the most popular traffic engineering practice in memory.

Greater Safety

To the traffic engineer the lines mean fewer accidents, safer high-

ways and lowered shoulder maintenance costs. In Ohio, for instance, the placing of edge lines on test sections of two-lane rural roads reduced accidents by 19 percent and deaths by 37 percent. Kansas tests were even more dramatic—accidents reduced 21 percent and fatalities 59.4 percent.

Agreeing with the statistics for once, motorists praise edge lines to the skies, and traffic engineers agree that if they tried to stop the practice, the public wouldn't stand for it.

"Everybody," says Delaware's Traffic Engineer William R. Car-

row, "is in favor of edgelines, mother and country."

The idea of painting reflective white guide lines on the right edge of highways is widely credited to Dr. John V. N. Dorr, retired metallurgical engineer and internationally known industrialist who, in his youth, worked with Thomas Edison. Dr. Dorr, still active and keenly interested in a multitude of subjects at the age of 90, heads the Dorr Foundation at Westport, Connecticut. Convinced that the lines would mean added safety for motorists, he persuaded Connecticut's highway department to install test lines in 1953. Today, the State has some 1500 miles of highway edge marked, and its engineers have made extensive studies to determine benefits of the policy.

Today, considerably less than ten years since Connecticut put in the first test sections, the sparkling white lines that delineate the separation point between highway pavement and shoulder are being used on more than 65,000 miles of highway. They are being extended so rapidly that the figure is being increased by more than 24,000 miles—over 33-1/3 percent—during 1961.

Edgelining

Thirty-seven states have edge-



Applying edgelines to the DuPont Freeway, south of Wilmington, Del.



One of the Ohio Department of Highways fleet of Wald Statesman pavement marking machines applies lane lines and edgelines to a section of Ohio highway. Ohio has over 8500 miles of highway so marked.

lining as an established policy. Six more are just entering the field with New York State being the latest entry. North Carolina leads, with over 16,000 miles of highway so marked, and an additional 8,000 miles scheduled for 1961. Ohio marks something over 8,500 miles, and Pennsylvania, which first started the policy in 1960, now has over 5,600 miles edgeline and plans to increase this by some 4,500 miles in the 1961 season.

Although safety organizations such as the American Automobile Association, the Dorr Foundation, Highway Research Board, Institute of Traffic Engineers and others work steadily for acceptance of edge lines, vigorous and vocal support comes from motorists themselves.



West Virginia has over 1600 miles of highway edgeline, and plans to increase this by more than 200 additional miles in 1961. The guide lines are especially helpful to motorists on winding roads.

Typical of such support is a letter written by Hector Morrow of Flint, Michigan, to the *Detroit Free Press*.

"While driving through other states," Morrow wrote, "we have observed and been comforted by the fact that on the highways there are painted brilliant white lines upon both edges, as well as the center line. This permits any driver to define exactly where the road edges are as well as the center, especially during heavy storms at night.

"Most drivers," Mr. Morrow goes on, "are familiar with the terrifying feeling associated with losing the identification of the road boundaries due to darkness and/or storms."

The Pennsylvania Turnpike, "Granddaddy of all turnpikes," has edgemarked its entire 470 mile

length since the pike was first opened. Its director of safety, Harold Roberts, says flatly that next to artificial illumination of highways, edgelines are the greatest single safety factor in the Turnpike's enviable record.

Greatest use of edge lining has been concentrated in the East, South and Midwest. Most of the Western states are now using it to some extent, although California, perhaps the last major holdout for the policy, does no edgemarking. The State contends that it achieves much the same effect through a sharp contrast between pavement (concrete) and shoulder (asphalt). Proponents of edgeline argue that the lines do more than delineate—they guide motorists.

When the edges of highway pavement are clearly defined by white, gleaming lines, traffic engineers find that motorists—at night—tend to guide by the edges instead of crowding the center line. This causes night-time traffic to keep further to the right of the center of the highway, reducing headon and sideswipe collisions. From the motorist's standpoint, it permits meeting oncoming cars without the annoyance and danger of trying to see the centerline through the glare of bright headlights.

The lines give motorists far greater nighttime confidence, as well as guidance, and this is especially true in fog and during storms. States such as Connecticut have found the practice virtually eliminates pedestrian accidents, and in Rhode Island, the

white edge lines provide a safety zone used by school children and other pedestrians who must use the roadside instead of sidewalks.

One of the strongest proponents of edgeline has been, for many years, Prismo Safety Corporation of Huntingdon, Pennsylvania. Prismo is one of the world's largest suppliers of traffic paints, and many years ago pioneered the use of glass spheres in paint to make traffic lines and signs reflective. Following its established policy of advancing traffic engineering and good traffic engineering practices, the Company serves as a central source to gather and disseminate information on edgeline.

The lines painted on the edge of highways wear far longer than do center or lane lines that receive more traffic. Generally, highway departments report edgeline life of 18 months to two, three and even more years. Meanwhile, studies by maintenance forces show that the lines, by discouraging use of the road shoulders, reduce shoulder maintenance cost. The New Jersey Turnpike estimates this savings at over 33 and 1/3 percent.

The result, traffic engineers say, is that the lines help to pay for themselves, perform an outstanding safety contribution and make for good public relations.

Through the leadership of companies such as Prismo and its affiliated company, Wald Industries, Inc., world's leading manufacturer of pavement marking equipment, traffic marking has come a long ways in recent years. Only a few decades ago, roads, if marked at all, were "painted" with lines of black tar. As this generally was applied to asphalt, it was only a little more visible than the rest of the road surface during the day, and stood out like a black cat in a coal bin at night.

When paint first entered the scene for traffic markings, the white lines caught on rapidly for day-time traffic directional purposes, but it was not until Prismo developed the reflective sphere process to make the lines visible under headlights that the markings went on 24-hour duty. Even today, some states, notably in the Northwest and Northeast, use little or not reflectivity in their traffic

lines. Experience has shown that the addition of glass beads speeds drying time of the lines and lengthens their life to an extent that makes use of the beads a major economy rather than an expense.

The glass spheres are made in many sizes, for a wide variety of purposes. Spheres so tiny they seem much like face powder have high refractive ability, and are used for signs. Traffic paints usually contain glass beads of several sizes, so that as the paint film wears under traffic, new spheres are constantly being exposed to replace those worn out or knocked loose from the binder.

"Traffic" Paint Volume

Increasingly, states and cities are using a "drop on" process, in which—although glass spheres are mixed with the paint—additional spheres are dropped on the freshly sprayed lines to provide immediate reflectivity.

The traffic field is one that has definite interest to the paint industry. It requires 17 gallons of paint to apply a 4-inch solid line one mile in length, with a wet film thickness of 15/000 of an inch. This figure, extended to the highway network throughout the United States, represents a tremendous market.

The encouragement of edgelineing is a major contribution for the paint industry, since edgelineing of a two-lane road would mean an additional 34 gallons of paint per mile. It also represents added traffic safety of proven value, so in encouraging the policy, paint companies not only help to create a larger potential market, but perform a valuable public service.

Painted traffic lines on highways have so long been accepted by motorists as essential to safe driving that they're hardly ever noticed until they aren't present—then complaints pour in on highway departments and traffic engineers.

Virtually unknown to the average motorist, too, is the fact that in recent years, as traffic has climbed steadily upward, a virtual revolution has taken place in the pavement marking field. The revolu-

tion applies to both paints and the machines used to apply it to road surfaces.

Paints have been developed to wear longer and dry faster. There's hardly a more challenging field for new paint ideas than traffic, for seldom is paint called on to stand up under the punishment it gets when it is applied to a road surface—the grinding impact of thousands of car and truck tires daily, the scuffing of turning vehicles, the grinding of dirt, sand and cinders, the extremes of summer heat where road surface temperature reaches far over the point where it can fry an egg to winter with snow, ice, snowplows, tire chains, salt and cinders.



A Wald Industries "Statesman" striping machine applying white reflective edge lines to a highway in Delaware. This is a divided highway, which explains why the machine is on the left side of the road. Paint spray units can be moved readily to either side of the machine, for striping either the right or left sides.

Striping Machines

Not so many years ago, lines were painted on pavement with a paint brush. It was a slow, tedious and dangerous practice, and comparatively few roads or streets had markings.

Compare this with today's modern striping equipment and the difference is staggering.

The State of Pennsylvania early this summer bought twelve striping machines, manufactured by Wald Industries. The machines will be used in striping some 30,000 miles of highway, applying center and lane lines and edge markings. They'll operate normally with a two-man crew, and the volume of striping they can accomplish is somewhat staggering.

Each machine has tanks to store,

under pressure, 375 gallons of white and yellow paint, and 2,250 pounds of glass spheres. Lines run from the tanks to high speed spray guns and glass sphere dispensers. Five such guns, operated by electrically-controlled pushbutton panels in either the machine's cab or from the rear, will put down any desired variety of lines, in combinations of white and yellow, solid or skip patterns, at speeds of up to 15 mph. Paint coming through the system under pressure passes through a special paint heater that assures an even flow even in coldest weather, and also hastens drying of the paint film on the road. The heated paint makes it possible for crews to apply traffic lines at

virtually any time in the year when the road pavement is dry, even when the thermometer drops below freezing. This vastly extends the normal painting season, and helps to assure year-round lines to guide and channel traffic.

Henry Barnes, internationally known traffic engineer of Baltimore, Md., says there's "more traffic engineering in a gallon of paint than in a thousand textbooks."

A woman in Altoona, Pa., writing to the town's newspaper, *The Mirror*, put it another way:

"There's nothing that says one has to follow what they read in the Bible any more than the follow the white lines on the highway," she wrote, "but if a person has any sense, he'll follow both."

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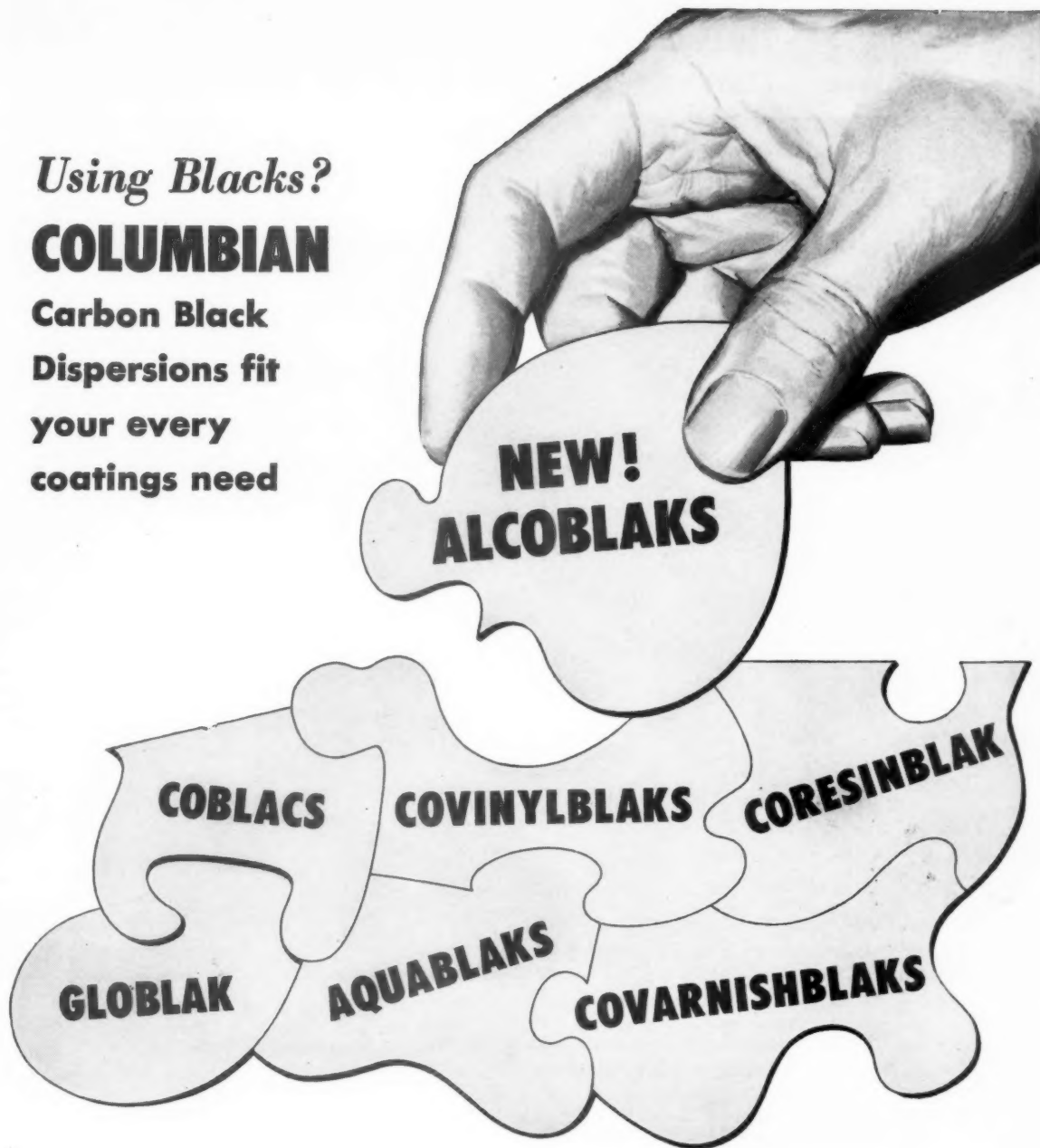
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ALKYD RESINS -- RECENT TRENDS

Part VI

Epoxidized Oil Modification and Thixotropic Alkyds

FUNCTIONAL GROUPS

Epoxidized Soybean Oil

Thus far, we have discussed the three important building blocks of alkyd resins—dibasic or polybasic acids, fatty acids or oils, and polyhydric alcohols. There are a variety of other functional groups which perform in very much the same way as alcohols or acids and which conceivably could find application in alkyd resin technology. One group which has always intrigued the imagination of the organic chemist is the epoxide group. This organic function may perform either as a hydroxyl or a carboxyl group since it will react with either of these as well as with amines, amides, and a wide variety of other chemical linkages.

In the past decade, epoxy-containing organic compounds have become freely available at relatively low cost. The particular epoxy compound which is the most inexpensive and the most interesting to the alkyd formulator is epoxidized soybean oil. This compound and may be considered polyfunctional since there are more than two epoxy groups per soybean oil molecule. In addition, the compound is of interest in alkyd resin formulation because it is oil-based and accordingly should demonstrate compatibility with the other components of alkyds.

The use for epoxidized soybean oil which has received primary attention over the past decade has been as a stabilizer and a plasticizer for vinyl resins. One of the earliest reports indicating its utility in alkyd resin formulation was provided by Chatfield [*Journal Oil and*

Colour Chemists' Association, 41, 301 (1958)]. Because of the ready reactivity of the epoxide linkage with carboxyl groups, one application which presents itself immediately is the use of epoxidized soybean oil to reduce acidity of an alkyd vehicle. Also, because the epoxy group will perform very much as a hydroxyl group will, one may utilize the epoxidized soybean oil as a partial replacement for the polyhydric alcohol. Here, of course, one must decrease the amount of oil or fatty acid to compensate for the oil length contributed by the epoxidized soybean oil.

It has been shown that epoxidized soybean oil, included in the formulation of long oil alkyds, effects a reduction in cooking time by as much as one-third because of its higher functionality. At the same time, the final vehicle has a desirably high viscosity. Thus, one recommended formulation requires that twenty per cent of the polyhydric alcohol normally used be replaced by epoxidized soybean oil. This stoichiometry is based on the assumption that the epoxidized oil molecule has approximately 2.5 equivalent hydroxyl groups. In utilizing epoxidized soybean oil in alkyd resins all of the ingredients may be combined at one time or the monoglyceride technique, in which the epoxidized soybean oil is used to replace part of the glycerol necessary for monoglyceride preparation, may be employed.

The epoxidized soybean oil may be incorporated into the alkyd resin in such a way that some of the epoxide groups remain unreacted. The highly polar nature of the epoxide group, accordingly, should improve the adhesion of the alkyd composition to a

variety of surfaces. In addition, such finishes are said to demonstrate improved corrosion resistance. As has been mentioned several times in this article already, improvement of corrosion resistance is one of the most important advances which the alkyd industry requires. One report indicates that if epoxidized soybean oil is included in an alkyd resin formulation, one may substitute inexpensive iron oxide for the more expensive rust inhibiting pigments such as zinc chromate and red lead which are normally used in primer formulations.

Another virtue of unreacted epoxide groups in a formulation is that they may react with the acids which are liberated during the course of weathering. This again improves corrosion resistance by neutralizing the corrosive effects of the liberated acids.

It is interesting to note that epoxidized soybean oil is finding application in protective coatings other than those based on alkyds. Thus, use in nitrocellulose lacquers has been proposed. A formulation comprising nitrocellulose, urea-formaldehyde resin, and epoxidized soybean oil is said to demonstrate greatly improved adhesion and better cold-check resistance. Still another interesting application which takes advantage of the functionality of the epoxidized soybean oil is its use as a curing agent for pyromellitic anhydride. These two reagents, included in a vinyl plastisol formulation, yield vinyl coatings considerably more rigid than those which normally result from plastisols.

The application of epoxidized soybean oil to the alkyd industry is an excellent example of the technological improvements which can be expected because of our ever-expanding chemical industry. Epoxidized soybean oil was developed as indicated above primarily for the vinyl resin industry. Farsighted chemists, however, have been able to recognize its virtues beyond its original field of application with the net result that the applicability of alkyd resins is being broadened. We can expect many more such advances in the years to come and the important ones, it goes almost without saying, will be derived from chemicals which are produced in large volume at low cost as is the situation with epoxidized soybean oil.

Thixotropy-Producing Agents

One of the important advances in recent alkyd technology has been the discovery of procedures for producing highly thixotropic alkyds which still maintain all of the desirable properties of a normal alkyd.

Several raw materials have been proposed as small percentage additives for inducing a high degree of thixotropy. The most important of these are low molecular weight polyamide resins which are condensation polymers of ethylene diamine and a dibasic acid containing 36 carbon atoms. These dibasic acids are produced by the heat polymerization of linoleic acid and are referred to in the trade as "dimer" acids.

The polyamide resins recommended for inducing thixotropy in alkyds are solids of medium hardness which melt at about 105°C. Their viscosity, above the melting point, falls off rapidly as is typical of most polyamide resins. They are primarily alcohol soluble but solubility is improved by a combination of primary and secondary solvents, the secondary solvents being aromatic or aliphatic hydrocarbons as well as

oxygenated solvents. In secondary solvents alone the polyamide resins tend to form gels. It is this gel forming characteristic, related probably to the hydrogen bonding characteristics of the resin, which is utilized in producing thixotropy in alkyds. As might be expected, this thixotropy is destroyed if highly polar solvents such as alcohols, ketones or esters are introduced into the composition. Another form of polyamide resin is available, however, which melts in the region of 190°C., and which tends to produce thixotropy even in the presence of polar solvents.

The basic technology is described in U. S. Patent 2,663, 649 issued late in 1953 to W. B. Winkler and assigned to the T. F. Washburn Company. Described in this patent are procedures for producing thixotropic or gelled paint vehicles by combining these vehicles, primarily alkyd resins, with relatively small amounts of polyamide resins. The combination is believed to be a chemical one since the polyamide resins are added during the process of cooking the alkyds. The results are thixotropic vehicles which are thick and jelly-like. The degree of thixotropy may be varied, of course, simply by controlling the amount of polyamide resin in the formulation.

Despite the jelly-like structure of the vehicle, the degree of thixotropy is so great that the introduction of the brush into the paint causes the vehicle to flow so that a smooth, even coat can be applied. Immediately after application, however, the vehicle gels again.

The paint, because of the high degree of thixotropy, will not demonstrate pigment settling. It is actually unnecessary to stir the paint prior to application. Also, because the thixotropy is restored as soon as the film is applied, dripping is minimized. Accordingly, these types of alkyds have given rise to the so-called "dripless" paints that have been widely advertised. At the same time, "sagging", one of the important problems with many alkyd formulations, is reduced to a minimum.

The gelled vehicles may be formulated in flat, semi-gloss, or high-gloss enamel paints; and the thixotropy in addition to the virtues described above actually enhances application properties. Also important is the claim that thixotropic paints will not flow back onto the brush as do conventional paints, thus making clean-up easier. Furthermore, the gelled paints will not drip off the brush onto other areas thus making it unnecessary to cover surfaces that are not being painted. Another advantage claimed is improved pigment dispersion which tends to eliminate floating and to provide greater color uniformity. Flooding, silking, color migration, and brush marks are all minimized.

The thixotropic principle has been applied to vehicles intended for use as one coat flats, egg shell enamels, semi-gloss enamels, gloss enamels, wall primers, sealers, and enamel undercoats. Recently, a gelled alkyd-based blister-proof house paint has been made available. Such thixotropic vehicles have become important factors in the "do-it-yourself" trend.

In the early years of this development, the growth of the gelled alkyds was rapid. Thus, in 1949, it was estimated that 180 thousand pounds of gelled alkyd vehicles were produced. By 1956 this figure had grown to six million pounds. Growth considerably beyond

this figure is anticipated, and it has been estimated that currently 120 paint makers use gelled alkyds in one form or another.

In addition to utilization of polyamide resins to obtain highly gelled, dripless compositions, one may use smaller quantities of the polyamide resins in the alkyd formulation to obtain vehicles with only sufficient thixotropy to prevent pigment settling. Since pigment settling and the need for stirring the paint prior to application is one of the big problems in the "do-it-yourself" trade, the polyamide resin-based thixotropic alkyds offer an important solution to this problem.

It is advances such as these which will continue to make alkyds more and more important to the consuming public.

In addition to the polyamide resins, several other raw materials have been proposed as additives to alkyd resins in order to produce thixotropy. A product with the trade name "Thixcin", a castor oil derivative, adds viscosity and thixotropic body to paint so that sagging and pigment settling are eliminated and brushing and penetration are enhanced. The product may be added to the pigment prior to dispersion.

Various other thixotropic producing agents of a proprietary nature have been announced from time to time. For the most part these are not ground into the vehicle but are simply added to the finished paint or enamel in the mixer.

Thixotropic paints based on polyamide resins have made considerably headway in England and Europe and there is indication that they are considered more useful there than in the United States. Interesting discussions of thixotropy as related to paint are contained in a house organ of the Cray Valley Products Company entitled "CVP Resinotes" (Spring, 1959) in two articles by A. R. H. Tawn and G. North.

Miscellaneous Raw Materials for Alkyds

A variety of miscellaneous raw materials for alkyd formulation have been offered by various producers and again are an indication of the vast amount of research underway aimed at expanding the horizons of alkyd resin technology. One such raw material is a pure monoglyceride intended as an aid in controlling solvency and viscosity of alkyds.

The particular virtue claimed when this material is included in an alkyd formulation is that it will increase the solvency of the final product in odorless thinners. The use of odorless solvents has been somewhat restricted because their solvency is not quite as good as that of ordinary solvents. This defect is said to have been overcome by the use of distilled or highly purified monoglycerides. At the same time the monoglyceride is said to decrease the viscosity of the final composition and stabilize viscosity against upward drift during storage. The monoglyceride is said to accomplish this without hurting water resistance, adhesion, or durability. At the same time, it improves hold-out properties, brushability, and ease of grinding and pigment dispersion. The monoglyceride recommended is a highly purified one and is said to affect solvency because it functions as an alkyd resin dispersant in the solvent. It is recommended that it be used by adding it before the pigment grind.

A perusal of the patent literature gives some insight into the many raw materials which have been suggested for incorporation into alkyds. For example, Italian Patent 461,821 (February 15, 1951) issued to Carello describes the use of furfural in alkyd resins. The use of hydroxyacetic or glycolic acid in alkyd resins is said to increase drying time and is described in a patent to Gray [U. S. Patent 2,374,598, April 24 (1945)]. The use of 2-furylacrylic acid derivatives in modified alkyd resins has been described by Rothrock [U. S. Patent 2,381,884, August 14 (1945)]. This, of course, is a means of introducing short chain unsaturation into the alkyd molecule. This same sort of technology is described in British Patent 569,525 (May 25, 1945) issued to Imperial Chemical Industries, Ltd. Unsaturation of this sort may also be introduced via the alcohol component of the alkyd resins. Thus, the possibility of using allyl and methallyl alcohols in alkyd resin combinations is described by Robinson [Journal Oil and Colour Chemists' Association, 33, 353 (1950)].

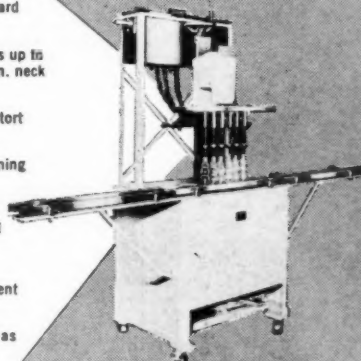
The utility of polyhydroxyacetic acid in alkyd resins is described in British Patent 583,268 (December 13, 1946). Resins prepared with this material are said to have a high degree of compatibility with other film formers and a decreased tendency to gel.

The use of bis phenol type materials in alkyd resins has been described by Hoogsteen and Peterson in U. S. Patent 2,626,939 (January 27, 1953). The particular bisphenols involved are those which result from the interaction of bisphenol with alkylene oxides such as ethylene oxide or propylene oxide.

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As examples, Greenberg cites the use of acrylic coatings on appliances and catalytic coatings on oil well derricks where chemical fumes previously made it necessary to use exotic metals.

"The market for present coatings will increase," Greenberg contends. "Any coating company can expect a gradual growth merely because of the growth of the economy. But the aggressive coating companies can find far greater growth in seeking untapped markets that can be serviced with the myriad of new products being turned out as a result of coating research."

Finding these new markets is a teamwork problem.

"It is the job of management to develop an atmosphere in which new ideas will flow naturally from all individuals of the company. It is not only the job of the re-

search department to come up with new products for the sales department, but also the responsibility of marketing and other employees to bring new products and new marketing suggestions to management. This search for new markets is based on a company attitude of enthusiasm and mutual respect for the abilities of each employee."

Greenberg asks his employees to keep this question in mind: "What does the customer need that he doesn't even know he wants?" It is this type of imaginative thinking, says Greenberg, that has enabled the company to produce products that are of great value to a customer before the customer even requests that they search for a product with these qualities.

Greenberg, a member of the board of directors of the Paint, Varnish and Lacquer Association, feels strongly that a coating company must be willing to gamble on a new market. "Take the potential of the prospective customer into account. You must be a party in the pioneering of new fields. Extracting coating requirements are an essential ingredient in almost every new field. The staff of the coating company must work closely with the staff of a company with an entirely new coating problem.

When careful judgment is exercised as to the potential of the new company, the risk involved is well repaid in sales for both the new company and its coating supplier."

In addition to seeking new markets, Greenberg points out that there is much a coating company can do to stay up-to-date with its present markets. As an example, he cites the trend after the war toward light-colored furniture. "This made dark-colored wallcoverings popular as a background," he explains. "Naturally, when light-colored furniture began to lose its popularity, so did the dark wallcoverings. Coating manufacturers must work even more closely with the home furnishings industry in order to know what the coming styles and colors will be in furniture, draperies and carpeting, so that they will be better able to prepare for the coming seasons."

In conclusion, Greenberg passes on this motto which he imparts to his sales staff: "The customer is always right, but be careful whom you take for a customer." By this he means that the customer must have the potential to warrant the expense of costly research, production and delivery involved in developing specialized coatings for specific companies.

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By

Edward Anthony

The author expresses his random reflections on various aspects of the paint industry. The opinions contained in this column are his alone and do not necessarily reflect those of this publication.

Heat or Humidity

THE hot weather of summer leads to hot-weather-type jokes. About the only common joke I know which relates to the paint industry is the old saw concerning the lady who wanted her living room painted the delicate blue of an ash tray she owned. Of course the painter perfectly matched the color—for he also painted the ash tray! It isn't often that a nationally syndicated comic panel concerns itself with paint, but I did notice recently that Bob Barnes' *The Better Half* showed a lady in a paint store complaining, "Well, why DON'T they make it?... They've had striped toothpaste for ages."

I do hope that the salesman was able to convince his customer that, since we DO make paint with varicolored spots, this is more desirable than stripes (and toothpaste *doesn't* come in this leopard-like form!).

Beside the solid and multi-colored types, paint has been *grained* on hand-rails for many years by skilled master painters. Currently do - it - yourself home painters can even apply textures and designs by roller on a solid base color. And of course virtually any design may be reproduced in factory finishing by single, double or even triple offset printing techniques.

Housing '61 Style

THE north temperate zone, a portion of which we inhabit, because of its varied and changeable climate, has caused the obtaining of shelter to be a pervasive problem. The social, political and economic development of mankind is intimately wound into the challenge of nature's elements and man's solutions. The agglomeration of people into what could be termed the precursors of our cities is virtually as old as man's appearance on earth.

For many millenia the materials of construction of shelter were almost exclusively gathered from the immediately surrounding area—lumber from forests, bricks baked in sunnier climes, and the snow homes of the eskimos in the cold north lands. Looking about today, one sees at least the first two of these (as well as many other construction materials), and all the types appear in infinitely varied form and color within such a small compass as a few blocks.

Among people who measure and evaluate such things (and to whom it is probably more important than to you or me) the current most impressive status symbol is the house possessed by a family. These dwellings come in all sizes, shapes and varieties. Split level or ranch, one or two stories, concrete slab or wood floor, carport or garage, plaster or dry wall construction; faced

with brick, stucco, stone, clapboard, aluminum, wood—the differences are limitless. Those of us who dwell in huge multi-storied apartment houses have almost as much architectural variety—inside and out—as our suburban neighbors, and the same pride. But with all, a house is not a *home* without a sparkling, gleaming coat of paint, so one might ascribe to it the appropriate appearance of well-being.

Just how big is this home business? Every working day almost 5000 new residences are completed! This 1,250,000-unit market absorbs a goodly portion of the one-billion-plus trade sales paint category—which is 60 per cent of the total paint, varnish and lacquer production of about \$1.8 billion. Painting is the second largest single expenditure for home repair and maintenance—a \$13 billion item for total yearly up-keep!

It is impressive to realize that individuals' home mortgage debt is about \$130 billions, almost seven times the '45 figure. It is obvious that home building has a tremendous affect on the production of furniture, appliances, glass, hardware, fabrics, tile, lumber, steel, aluminum, porcelain, electrical wiring and fixtures, plumbing—and paint—to name but a few of the multitude of primary and secondary industries that serve our growing population. In fact, there is hardly a manufacturing enterprise that does not directly or indirectly supply a product for the home—even the automobile is kept in a part of the house, in the garage!

The mounting cost of skilled labor has led to tremendously increased utilization of pre-fabricated construction parts. And not only pre-fabricated, but also *pre-finished*. Even custom-built homes incorporate numerous pre-fab units to bring down spiraling costs. Completely pre-fabricated housing is capturing an increasing share of this market—the figure has zoomed spectacularly from five per cent in 1950 to 15 per cent last year, and by '75 it is predicted that 40 per cent of all homes built in this country will fall into this category (*Chemical Week*, 6/3/61, p. 87).

To shorten construction time, the '30's brought the advent of small portions of buildings pre-fabricated

in factories. The second World War gave a heady impetus to this idea and whole buildings were fashioned so that they could be assembled any place with little skilled labor required, and actually a minimum of any sort of labor. Peace-time brought one of those seemingly inevitable steps backward until local rules and regulations could catch up with technological developments. And so it has been a dogged struggle to introduce this modern approach to building construction all over the country, a fight not completed by any means.

Contribution

Ingenuity is the only limit to the potential of pre-fabricated struc-

tures. This "new" method is merely the application of some of the century-old lessons of the Industrial Revolution—mass production through interchangeability of parts and thus lower costs—to a very old problem. The application of modern techniques of production has wrought great change in the finishes applied to these new homes. The time-honored oil-based paint, applied manually by brush, which dried in hours—or days, it really didn't matter too much—has had to be replaced with coatings which could be automatically applied, cured in a matter of minutes and produce a surface of even greater longevity.

Total success certainly has not

been achieved in meeting these very stringent requirements. However, the results of painstaking, basic research in pigments, vehicles, solvents and additives has produced in merely a decade and one-half, amazingly notable advances.

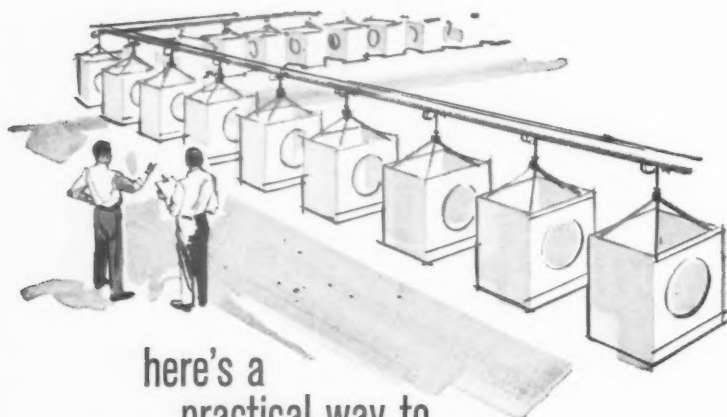
Creative thinking applied to all forms of construction has produced innumerable new approaches toward solving the multitude of problems that have arisen as a result of this attempt to almost wholly revise the thinking toward one of our three most basic needs (food and clothing being the other two). Materials hitherto alien to this particular industry, new versions of older materials, entirely new materials of construction, and the tried-and-true standbys—all have been integrated into this new, modern approach to an old problem. Finishes for virtually all of these surfaces had to be developed; thousandths of an inch thicknesses of specifically designed organic polymers—they dry in seconds and last many years.

Virtually every interior and exterior surface of a building can be pre-fabricated—and in most instances, finished—on modern production lines. The lumber products industry has been particularly aggressive in adapting and upgrading their products to meet this new situation. Pre-finished wall, construction and partition paneling has changed interior appearances considerably. To an equal extent, factory primed exterior siding has had its effect. Various hardboards and particle boards use once discarded material to great advantage, particularly when properly coated.

Exterior aluminum siding, awnings, patio covers—invariably finished on highly automated production lines with products of our industry designed to last a generation—are a part of this revolution. Equally so is the use of coated aluminum for interior tiling and coated steel as partition paneling.

The development of latex paints has focused attention on truly significant improvements in the useability of wall finishes. These air dried coatings now have durability built in to match their high temperature cured counterparts.

This has been a miniscule recitation of our interest in this



here's a practical way to shave epoxy coating costs

The ideal combination of low cost and good drying properties offered by Emersol 9315 Liquid Fatty Acid have stimulated its increasing use as a modifier for epoxy ester coatings. Several of its properties—its uniformity, light color and resistance to yellowing—are equal or superior to the highest-priced modifiers. All properties considered, Emersol 9315 makes an excellent choice for all but the fastest dry applications.

Any evaluation of appropriate properties must weigh the various performance fac-

tors against price. When you consider that Emersol 9315 sells for less than 20 cents per pound (tankcar lots), it presents an outstanding opportunity for producers to trim costs while maintaining the quality of their coatings.

We urge you to try 9315 as a low-cost extender for dehydrated castor fatty acids or other higher priced modifiers. It may be just the material you have been looking for.

We'll be happy to supply sample quantities promptly. Just write Emery's Fatty Acid Division at the address below.



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Specifications	Titer °C	Iodine Value (Wij's)	Maximum Color			Acid Value	Sap. Value
			Photometric Index	Lovibond (5 1/4" cell)	Gardner		
Emersol 9315 Double Distilled Liquid F. A.	5 max.	145-160	22/1	7Y/1R	2	195-201	197-203

rapidly changing industry. The Coatings industry is challenged as nowhere else to keep pace with the demands of the important and evolving construction business.

Blistering

"WHEN you think of blisters, I think of hard work." Oh, I know this sentence borrows the phrasing of a popular advertising slogan; remember also that another form of blisters plagues organic finishes. The whys-and-wherefores of the poor performance of amine-catalyzed epoxies, when immersed in water, is the subject of two informative articles. In *Journal of the Oil and Colour Chemists' Assn.* (8/60, pp. 653-673), D. M. James discusses the influence of solvent as part II of an investigation into "The Moisture Resistance of Cold-Cured Epoxide Resin Paints."

It does seem an anomaly that one of the many useable forms of one of the most resistant vehicles developed by the resin chemists should be so susceptible to damage from water immersion. Many an otherwise lesser resin has better resistance in this respect.

James' research has reached some interesting conclusions: "The moisture resistance of cold cured epoxide paints is greatly dependent on the solvents from which they are deposited. Slow evaporating, water-soluble solvents, such as glycol ethers and diacetone alcohol, cause rapid and heavy blistering in distilled water." This is hardly the first instance of the importance of the effect and influence of the evaporative portion of an organic coating. He further states that "stoving the films greatly reduces the blistering, and it is suggested that solvent is retained at or near the adhesion interface causing blistering by osmotic pressure."

Another investigator, H. Moroson, reports on this same problem, "Susceptibility of Epoxy Coatings to Damage by Fresh Water Immersion," in *Corrosion*, May, 1961. He reaches a somewhat different conclusion concerning why this failure occurs: "Epoxy coatings for concrete and steel intended for water immersion exposure are susceptible to blistering after one week to one year. This phenomenon is apparently independent of formula-

tion and method of application but depends on conditions of humidity and temperature during application, and is related to an incomplete cure of the epoxy resins."

Moroson notes that these types of coatings are more sensitive to distilled water than to tap water. His comment on curing conditions is pertinent: "Air drying time is 2 to 6 hours, but it takes some seven days to develop full chemical resistance at optimum temperatures and humidity. If temperatures are sufficiently low and the rate of cure is very slow, amine might evaporate to such an extent that full cure is never realized."

However, the mechanism of failure appears to be much the same according to both researchers, for Moroson does report that "...the cause of blistering is incomplete cure of the resin, which is softened by water causing bubbles to be formed by surface tension forces. . . Water has the ability to swell all plastics and to cause osmotic type blisters. . .the soft, undercured bottom layer of coating allows permeation of water. . ."

Though differing in detail it is readily seen that their conclusions concerning the importance of proper cure, particularly at the substrate interface, do coincide.

A Reichard-Coulston Technical Report

...for manufacturers of industrial primers, shopcoats and specification paints.

Data on a new, low cost Reichard-Coulston natural iron oxide pigment—a product that is doubly economical because of its unusually high iron oxide content and exceptional ease of grind.

Preliminary findings indicated that Reichard-Coulston's new "1681" Iron Oxide was a superior, yet economical, pigment. Subsequent tests confirmed it.

Here are the results:

"1681" 's 96% Fe_2O_3 content provides the formulator far more leeway in the additional use of low-cost extenders where applicable.

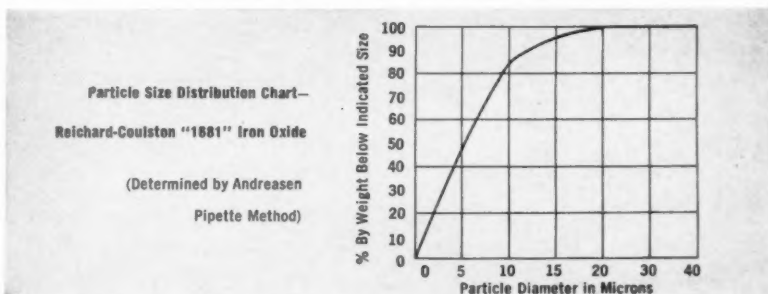
Cost of new "1681"—Just 5½¢ a pound, F.O.B., Bethlehem, Pa. (In less than 10 ton lots, 5¼¢ a pound.)

Features like these are major reasons why Reichard-Coulston "1681" is economical to use. Here's another:

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Facts like these indicate why this Reichard-Coulston new natural iron oxide pigment is worth consideration by every producer of industrial primers, shopcoats and specification paints.

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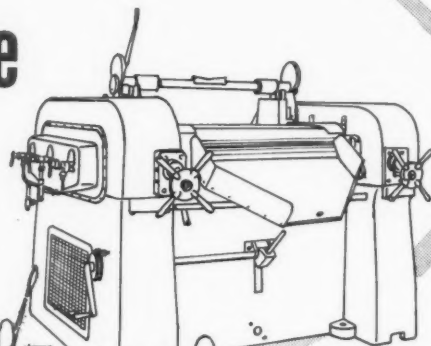
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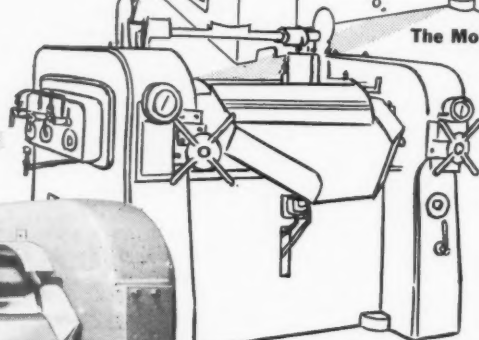
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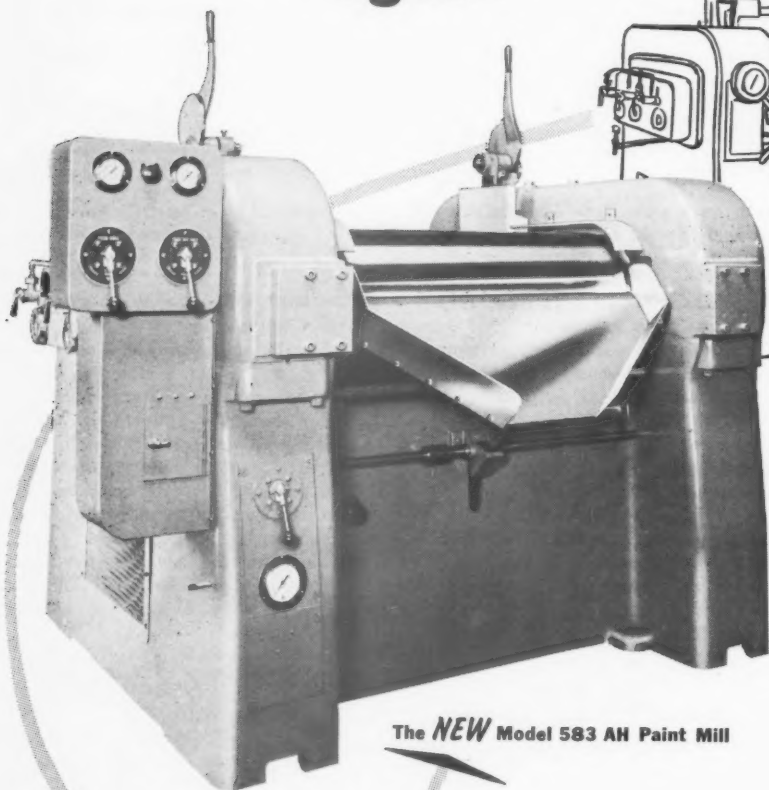
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The Model 1A
Paint Mill



The Model 661 V Paint Mill



The **NEW** Model 583 AH Paint Mill

Available in horizontal design
as shown, or with vertical
roller arrangement.

LEHMANN Paint Mill engineering has created at least three important break-throughs in paint making technology. First was the introduction about thirty years ago of the Lehmann Model 1A, the first modern mechanized paint mill. The second was the development about 12 years ago of the Model 661 V—first of the Sight-O-Matic type of mill.

Now Lehmann offers the new Model 583 AH, a completely hydraulically controlled paint mill of the newest design. In this the control points have been reduced from four to two. Adjustments are made by pressing a mushroom type button. The center roll is fixed, only the two outer rolls being movable to adjust pressures. A flick of a valve handle activates the Float-O-Matic feature introduced by Lehmann some years ago.

As each of the three Lehmann Paint Mill models mentioned has been introduced it has been unsurpassed for production among all mills previously designed. Each has been notable for increasing the mechanization and reducing the human element in this type of equipment.

Ask us for complete information regarding our new Model 583 AH Paint Mill
— the newest machine for reducing paint making costs.



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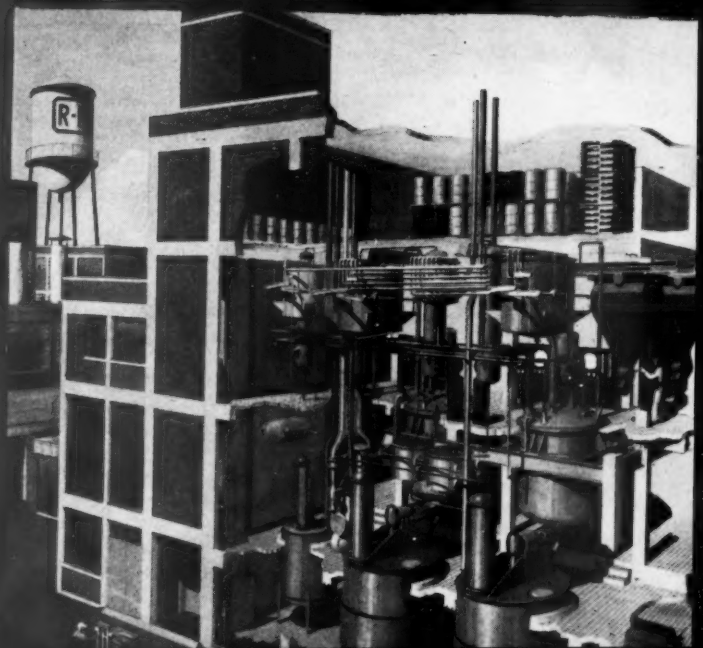


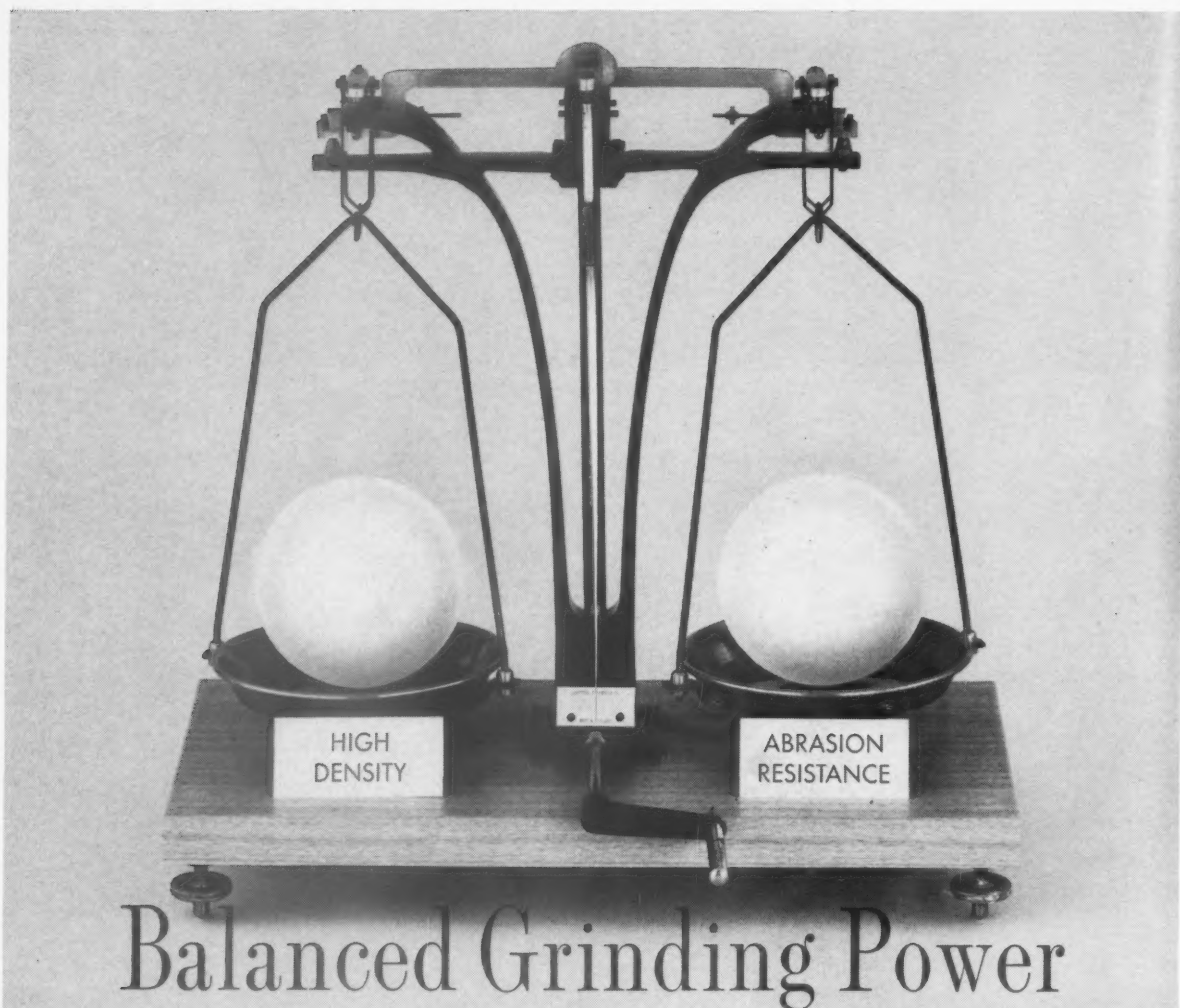
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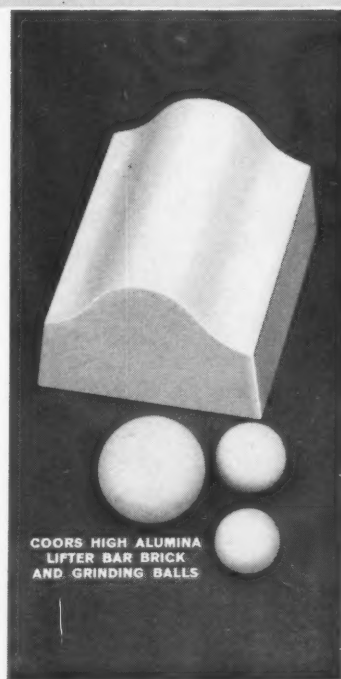
Balanced Grinding Power

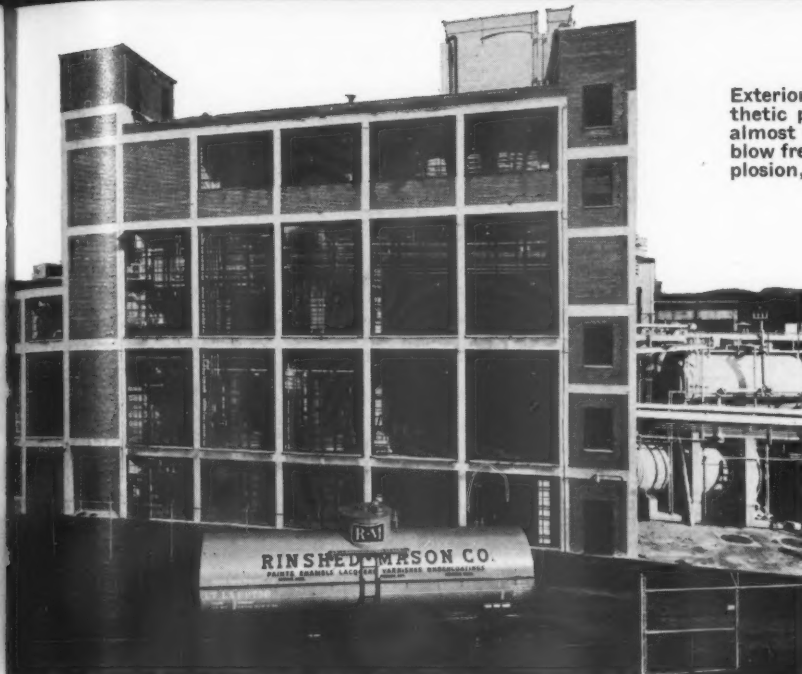
The power to grind the charge in your mill comes from the rotation of the mill and from gravity—the force that causes the pressure of one ball against another. This pressure is in direct relation to the ball's density and its ability to grind the charge material. This pressure also is in direct relation to the abrasive forces directed against the grinding media. Thus, it is necessary to obtain a balance between density or grinding power—and abrasion resistance. Coors grinding media is made from a formula which achieves the best balance between high density for grinding power, and bond strength for resistance to abrasive forces. Coors has 12 years experience in the production of high density media, including experimentation with higher densities and lower proportions of bonding material. Coors balanced media is the result of this work—maximum grinding power with minimum wear. Experience gained by Coors has also produced technical knowledge on the grinding conditions necessary for optimum grinding results. This knowledge and information about Coors High Density mill lining and steel reinforced end linings is available to you.

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Exterior view of Rinshed-Mason Company's synthetic polymer plant. The facing wall is composed almost entirely of "clip-in" windows which would blow free with little resistance in the event of an explosion, minimizing total, overall damage.

RESIN PRODUCTION AT RINSHED MASON

By Howard H. Robinson, Jr.*
and Edwin R. Wolfe**

ACCURATE, fully-controlled kettle temperatures, exact component measurement, high production efficiency, improved quality and a great increase in safety—these are among the benefits achieved by Rinshed-Mason Company, Detroit, in building a new centrally-heated, closed, solvent-cooking system for resin production. These resins are used by Rinshed-Mason Company in the production of a multitude of industrial paints and chemical coatings.

The fully modulated heating system for the kettles was designed around a liquid heat-transfer medium that operates at atmospheric pressure to produce minimum color and high quality synthetic polymers.

Safety Features

The system and the building constructed especially to handle the processing equipment offer the utmost in safety. The synthetic fire-resistant heat transfer fluid is heated in a separate building and pumped to the polymer plant through insulated pipes. The comparatively low heat range at which

the reactors operate—generally between 125°F and 550°F.—reduces the danger of auto-ignition of any of the chemicals and oils involved.

Capacity of the four-story plant, opened in 1958, is more than three million pounds of resin a month, including alkyds, acrylics, water-soluble resins, polyesters, epoxies and other paint and chemical coating resins. It is located on the eight-acre Detroit site, which houses the largest of the Rinshed-Mason manufacturing operations, general offices, and extensive laboratory research facilities. There are also plants in Anaheim, Calif., Windsor, Ontario, Canada, and the former Wolverine Finishes Corporation plants in Grand Rapids, Mich., and Morganton, N. C.

Rinshed-Mason is a major supplier of automotive finishes for original car production, automotive refinishing products, and industrial finishes, including mobile homes, appliances, boats and motors, aircraft and missiles, etc., and through the Wolverine plants—furniture finishes.

In the face of rapidly expanding industrial sales and a correspondingly greater demand for more and better resin, the entirely new, \$1½

million plant was constructed in 1958. The fire-resistant, reinforced concrete structure is located at the edge of the manufacturing area. The wall facing away from the other facilities is made almost entirely of glass "clip-in" windows. These are designed to yield under pressure to prevent an explosion occurring which could render the sprinkler system useless. The other three sides are windowless firewalls.

Gravity Flow System

The four-story design provides for a gravity-flow system to reduce material-handling costs.

Top Floor—Dry raw material storage.

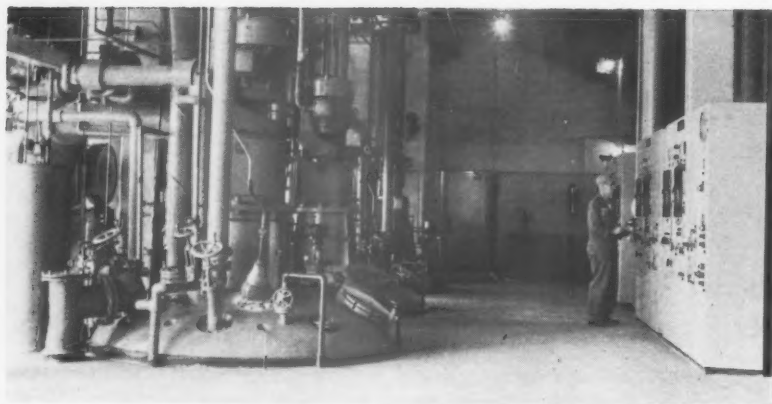
3rd Floor—Weighing and metering equipment the tops of three process kettles and the master control panels.

2nd Floor—Automatic control valves, Aroclor pumping equipment, and tops of thin-down tanks.

1st Floor—Thin-down tanks and filtration equipment.

In-process resins are held in eleven insulated, 7000-gallon tanks

*Factory Manager, **Engineer, Polymer Plant, Rinshed Mason Co., Detroit, Mich.



Tops of three reaction kettles and their master control panels are located on the third floor. Chief kettle operator Jack Greenway records temperature and pressure readings from one of the panels, onto his control log.

located on a heated slab adjacent to the polymer building. Also, adjacent to the building are storage tanks for solvents, oils and chemicals, with a total capacity of up to 1½ million pounds.

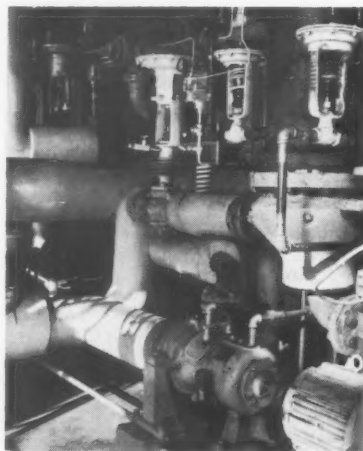
A six-million BTU/hr. gas-fired heater for the system is located in a separate building. A main circulating pump supplies the heat transfer fluid, Aroclor 1248* through insulated pipes to the polymer plant.

Each kettle also has its own circulating pump and a series of pneumatically-controlled valves, including a three-way modulating valve, which controls the flow of Aroclor into the three zoned jacket surrounding the kettle. Thus, with one heating unit each kettle is operated independently and at different temperatures.

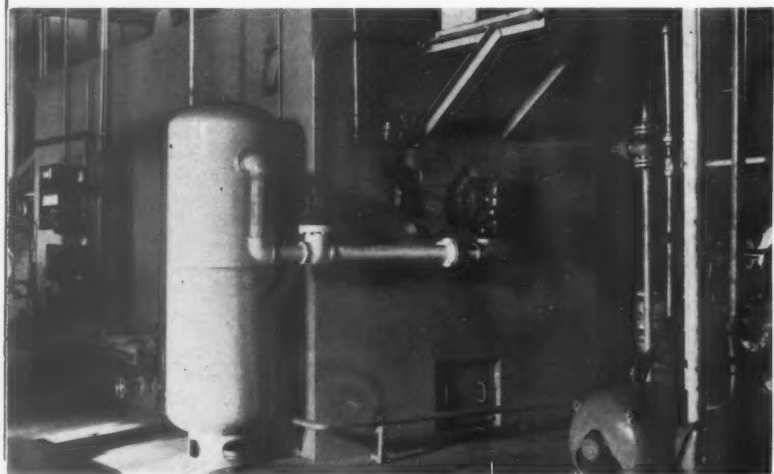
The independent circulating systems in the kettles allow complete modulation of both heating and cooling cycles. The efficiency of the heat-transfer medium, and the ease with which it can be controlled permit complete temperature flexibility in each kettle.

Two of the three resin production systems consist of 3500-gallon agitated reaction kettles, 500-square-foot condensers, and 7000-gallon thinning tanks. The third system has a 1000-gallon kettle, a 400-square foot condenser and a 2000-gallon thinning tank. All three have automatically-controlled, continuous water decanting solvent refluxing equipment.

*Trademark of Monsanto Chemical Company.



This closeup of a kettle's recirculating pump and part of the valve complex shows the insulated pipes which are the "hot" side of the system, and (upper right) the beginning of the water-jacketing which enables complete modulation of the "cold" side.



The heat transfer liquid, Monsanto Chemical Company's Aroclor 1248, is heated in this six-million BTU unit located in a nearby building. Natural gas is the primary fuel, with stand-by oil service also available.

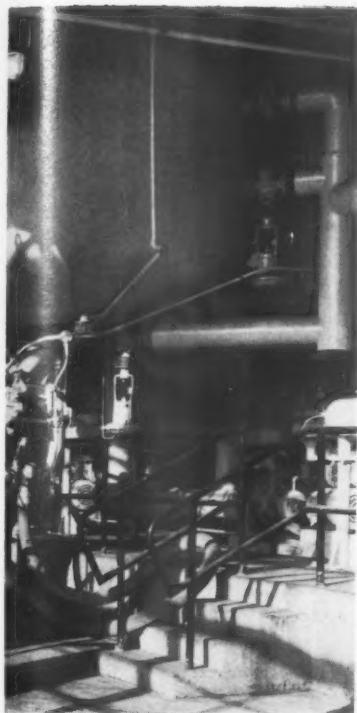
There is room in the polymer plant for two more 500-gallon kettles and related equipment. There also is room in the heater building for another six-million BTU/hr. Aroclor heater.

Automatic Controls

On the fourth floor of the polymer building dry materials enter the system through a hopper scale which moves on dual tracks to the kettles. Liquids are pumped into weight tanks from outside storage. The liquid weighing system is controlled electronically with automatic record printing and item sequencing. As materials are weighed, an electric typewriter automatically records the batch number, date, item, and exact weight. The typewriter, not being explosion-proof, is located in the motor control center, a small "outside" room adjacent to the third floor.

All kettle controls are located on identical third floor panel boards near the tops of the reaction kettles. In addition, a multi-point temperature recorder in the superintendent's office marks a permanent record of 16 operating control points. During processing, batches can be heated and/or cooled independently within the operating range of the Aroclor—up to 600°F.

When a resin reaction is completed, the resin flows from the kettle down into the thinning tanks containing the required let down solvent. The resin is then filtered and pumped into the storage tanks mentioned earlier, until it is used in



On the second floor are the bottoms of the reaction kettles, and tops of the thinning tanks. Each kettle has its own Aroclor circulating pump (right), and system of pneumatically operated valves (upper right). Thus, the one central heating system can operate each kettle at a different temperature.

producing a complete Rinshed-Mason finish.

By using Aroclor, a non-presurized, non-flammable system was made possible. This reduced the installation and maintenance costs and made a safer operation.

A good illustration of the safety attained with this heat transfer media occurred during the start-up of the polymer building when a tube-bundle failure in the central heater resulted in Aroclor pouring into the fire-box. Smoke and fumes resulted, which went up the stack. However, there was no fire, and the plant was back on stream in two weeks. With a volatile heat-transfer media, a serious fire might have resulted.

In addition to the production systems, there are two complete pilot kettle plant systems. The 100-gallon kettle duplicates as closely as possible the larger units, even to a similar control panel and Aroclor circulating system. The second unit is a five-gallon kettle and is the first step beyond the "test tube" stage.

Paint Mixing...



Top of mixer extends to second floor where it is charged. Note dust control hood.



Note thoroughly dispersed and blended latex paint in mix just before discharge.



Finished mix is discharged on first floor through valve in bottom of mixer.

- Cut Mixing Time by One Half or Better
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Important news for users of 2-gallon pails —

Milton introduces the TINSTEEL pail, a major breakthrough in pail production—one which cuts your handling costs, slashes dealer returns and helps boost your sales!

WHAT makes new, Milton 2-gallon TINSTEEL pails so special? Several important things:

1. Milton TINSTEEL pails are made of heavy gauge *tin-plate*. This eliminates the possibility of coating flaws inside or outside the pail. Spoilage is reduced.

Another factor in this regard is TINSTEEL pails' 12-lug covers. They fit each pail tightly. This, plus minimal "head-space," reduces the possibility of skinning.

2. Because they are made of tin-plate, Milton TINSTEEL pails can be lined with the same material that has proved so successful in gallon and quart cans used for emulsion paints.

3. Thanks to special machinery, new, TINSTEEL pails come in a range of sales-attracting colors! (Left uncoated, tin-plated TINSTEEL pails stay bright, fresh-looking, attractive.)

4. TINSTEEL pails come to you packed in the same type of kraft paper bags which have proved so practical over the years for packing smaller sized paint cans. Net

result? Empty, TINSTEEL pails are handled and stacked as easily as smaller paint cans.

5. Another factor recommending Milton 2-gallon TINSTEEL pails is their unusual strength. The heavy gauge steel under their bright tin-plate makes them enduringly rugged.

Also, Milton TINSTEEL pails have *straight* sides. This gives them *vertical* strength, makes them resistive to waste caused by damage in handling and stacking.

6. Because production varies seasonally, many successful firms prefer to hold materials stocks to a minimum, ordering additional items as needed.

You can follow this profitable practice secure in the knowledge that fully automatic equipment enables Milton to deliver all the 2-gallon TINSTEEL pails you're likely to need to keep production flowing smoothly. (Milton can now turn out enough TINSTEEL pails daily to meet the total requirements of *all* users!)

Of course, there are other advantages, too, in buying 2-gallon TINSTEEL pails—and smaller sized cans—from Milton. Consider these:

Milton service is quick. Often you receive delivery within 24 hours after you call.

Milton 2-gallon TINSTEEL pails are available for shipment with other can sizes in mixed carload and truckload lots or almost any fraction thereof.

Milton containers are moved from the carrier into your plant on dollies. This mobilizes receiving and speeds unloading time. The entire operation proceeds with minimum use of your manpower. Dollies are left in your plant until the next Milton delivery; this facilitates movement of cans from storage point to production line. Again, both time and labor are saved. (This service is available within trucking radius of New York City.)

For all these advantages, Milton TINSTEEL pails are competitively priced.

Whether you presently use 2-gallon pails, or may someday, find out more about the superior, new kind Milton makes. And for all types of cans—lined, unlined, plain, lithographed, standard and made-to-order, enjoy the time-saving, dollar-saving advantages of dealing with Milton. A trial order will convince you. Call today. EVergreen 3-1100.

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Our 34th Year



JOB DESCRIPTIONS— A TOOL FOR MANAGEMENT

By

Lawrence Shatkin

THE primary function of a manager is to manage. How well he performs this task is determined by how well he plans, organizes, coordinates and controls the activities of persons under his authority. A production manager must not only be concerned with the day-to-day operations, but must focus his thinking on how he can improve his own performance, develop further his subordinates, and obtain greater effectiveness with the number of men at his disposal. A job description is one step in this direction.

Job descriptions are not difficult to write. In fact, for most routine factory jobs, the contents of each job can be analyzed with some degree of certainty. We must concentrate our efforts in finding out what the job is and describing it.

Objectives of the Job

Much of the required information for these lower-leveled jobs should be known to the manager so that very little probing is necessary. A starting point is to determine what the objectives of the job are. It is important that these job descriptions describe a job, not what the employee should do. These job descriptions should become part of organizational planning, and represent management's plan in its projected assignments.

When to Analyze Jobs

Job analysis is essentially the division of a job into its component parts, and refers to the process of studying the operations, duties and organizational aspects of the job. An outgrowth of this analysis is a job description.

A job analysis is usually necessary when changes have taken place because of innovations, technological improvements, the introduction of new products, changes in personnel, and new demands made upon a company (and its managers) to assure company survival and growth.

Since latex paints have gained a very important role as a surface coating, new types of machinery and equipment have been substituted for older facilities. This, I believe, calls for a job analysis with the possibility of modifying the job where improvements in manufacturing methods can be secured. In the use of high speed equipment, new considerations must be taken into account, such as, the position of the blade, the diameter and design of the blade, the loading of the pigment, attention to increased temperatures, dusting and other job conditions, and many formulating techniques that assure satisfactory dispersion and performance of the paint. These circumstances justify a review of the job involving the use of these machines.

Preparation of Job Descriptions

It is advisable to have the employee participate in writing out his conception of what he thinks are the most important elements in his job and approximately how much time he devotes to these activities. It is important that you impress upon the employee that his performance is not being considered in constructing this job description, but are interested in gathering these job descriptions in order to review them and possibly make improvements in our operations.

A job description should also be written by the employee's supervisor and both copies submitted to the production manager for review. The final job description should summarize the facts disclosed by job analysis in systematic order. It should indicate the comparative importance of various activities and note the most important element of the job and how this job contributes to the whole operation. The completed job description clearly states what has to be done by anyone assigned to the job.

Two simple job descriptions are depicted below:

Job Description—Head Shader

1. Shade batches.
2. Prepare batches to be filled before filling crews start day.
3. Thin batches when necessary.
4. Inform the laboratory director

Opinions expressed in this feature are not necessarily those of any particular firm or organization.

when an unusually large amount of shading material is used, as indicated on his shading ticket. (These records should be accurate and legible).

5. Cooperate with his foreman on manpower, releasing one of his helpers whenever possible or necessary to aid production.

NOTE: The most important part of this job is to shade continuously in order to keep ahead of the fillers. Therefore, all of his requirements should be brought to his work area, by one of his helpers, and communications maintained with the laboratory by one of his helpers.

Job Description—Pebble Mill Operator

1. Load pebble mills.
2. Wash pebble mills.
3. Bring samples to the laboratory for checking of dispersions, color, body, etc.
4. Obtain drums in the yard if needed before a utility man can attend to it.
5. Inform foreman of any batches that do not look right.

6. Clean area regularly.

NOTE: The most important part of this job is to load all mills scheduled for the day, so we do not fall behind in this area.

The length and quality of job descriptions should be considered at the very beginning. These job descriptions should be simple and concise, and avoid duplication, details and superfluous material. Thought should be given to why these job descriptions are being written, what information is desired, and who will read them. We should indicate what are the main functions of the job and explain them in a simple, concise manner. The functional description considers the job as a whole.

Uses of Job Descriptions

1. A job description is helpful to the worker and his supervisor.
2. When part of a work simplification program, they suggest possible improvements in methods.
3. They assist in implementing a training program.
4. They can help in improving

morale by indicating the importance of the job and what it contributes as a part of the whole operation.

5. They help the supervisor in that he knows what is expected from the job and what the "big" factors of the job are.

6. They may be helpful in safety programs by indicating hazardous acts and suggesting changes in operation.

7. They are essential in planning changes in organizations and reorganizations.

8. They are essential to wage and salary administration programs.

A job description is a starting point toward performance standards. We should aim for performance descriptions which informs us what the employee is doing. This will focus our attention on the worker and make him, rather than the job, the point of reference. In turn, the worker will know what is expected of him, and enable management to evaluate his worth to the company. In this way, the employee is looked upon as an asset and his dignity as a human being is raised.

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Standard Laboratory pH Meter 115

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Photoelectric GLOSSMETER



For reliable gloss measurements according to ASTM D523-53T on Paints, Varnishes and Lacquers

Also for

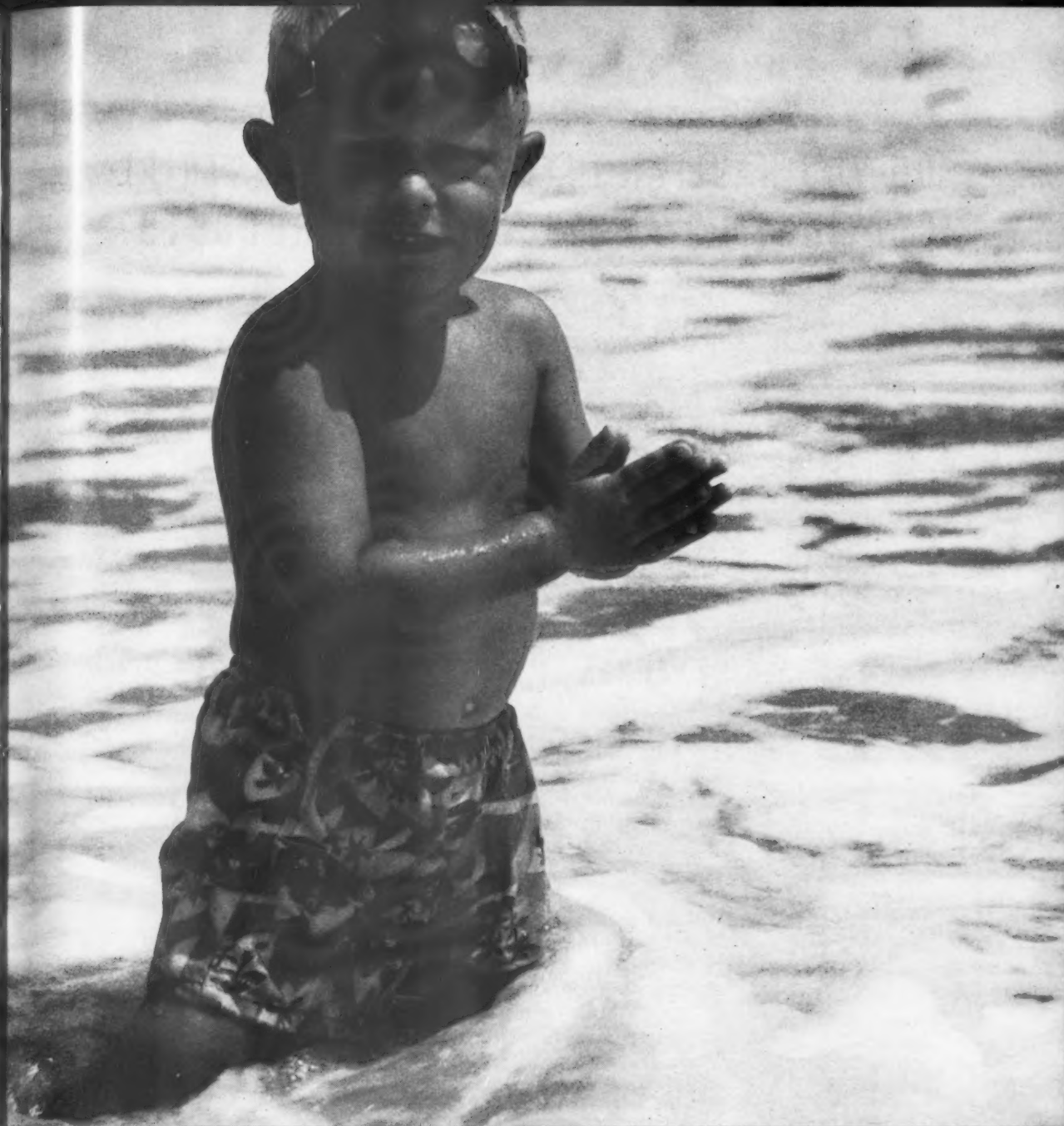
- Tristimulus Colorimetry with 3 Filters
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Then most certainly you should evaluate...

MD 737

EXTRA-FINE, SUPER-LUSTRE ALUMINUM PASTE

This new Aluminum Paste perfected by MD research and development is an extra-fine lining, high solids aluminum paste pigment designed specifically for spray applications and industrial coatings.

In Industrial Coatings, this pigment yields films of exceptional smoothness and chrome-like appearance.

Especially recommended for the pigmentation of Aerosol Paints because of the mirror-like character of the finish.

PROPERTIES:

- Grade: MD 737 Extra-Fine, Super-Lustre Aluminum Paste
Approx. Mesh Size: 100% thru 325 mesh; 99% thru 400 mesh
- Non-Volatile Content: 74.0% minimum
- Volatile Content: 26.0% maximum Mineral Spirits
- Approx. Covering Area on Water: 25,000 sq. cm/gram
- Approx. Specific Gravity and Bulking Value: 1.70-.070 gals/lb.



METALS DISINTEGRATING COMPANY

Division of American-Marietta Company
General Offices, Department F, Elizabeth B, N. J.

New Developments

Esso Robot Prepares and Paints Smooth Vertical Surfaces

Esso Research and Engineering Co. has designed a robot, resembling a small army tank, to prepare and paint relatively smooth metal surfaces both vertically and horizontally at a speed of about one-half a foot per second. A preliminary model of the device has been built and has successfully demonstrated the feasibility of the idea. Chief potential applications appear to be large metal storage tanks such as those used in the oil industry, and possibly ships' hulls and decks.

Magnets set into rubber treads similar to those on armored tanks keep the robot painter stuck to surfaces. An air-operated turbine connected to the treads drives the

device. Direction is decided by an operator using pneumatic controls. Paint is fed through a hose under pressure.

A pressurized roller applies the paint after the surfaces have been prepared by a mechanical chipping tool, in one continuous motion.

Esso engineers estimate that four such automatic "tools"—about three feet long and one and one-half feet wide—could paint a medium-sized tanker in 16 man-days, compared with 200 man-days manually.

The cost of painting such a ship by regular manual methods averages as high as \$20,000 and protection sometimes lasts for as short a time as two months. If "robots" can be perfected, the same job could be done for between \$7,500 and

\$14,000 and would last for 1½ to 2 years. The service life in both instances is, of course, influenced by the type of paint used.



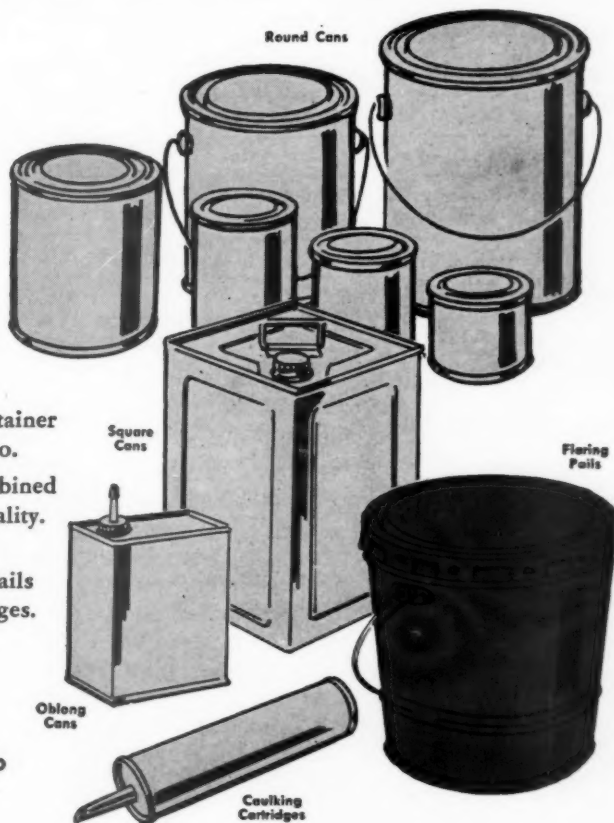
Engineer Gerard Canevari uses specially rigged toy tractor to demonstrate maneuverability of robot painter.

4 Advantages of DAVIES Container Service

1. **Three Plants for Prompt Shipment.** Davies has container plants in Cleveland, Conneaut and Massillon, Ohio.
2. **97 Years Container Experience.** The extensive combined experience of the Davies plants insures reliable quality.
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4. **Complete Design & Lithographing Service.**

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*6 ways
to meet
the exact requirements
of your
exterior paint formulations*

AZO leaded ZINC OXIDES

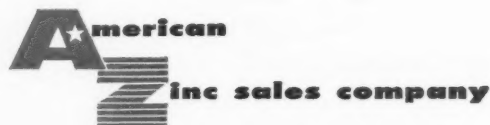
TYPE	AZO 50-L	AZO 35-L	AZO 35-M	AZO 18-L	AZO 18-L-S	AZO 12-L
	Cofumed	Cofumed	Blended and Acicular	Cofumed and High Basicity	Blended and Acicular	Cofumed
Consistency in Paint	Low	Low	Medium	Low	Medium Low	Low
Specific Gravity	5.95	5.85	5.85	5.75	5.75	5.70
Weight Per Solid Gallon (Pounds)	49.56	48.73	48.73	47.90	47.90	47.48
One Pound Bulks (Gallons)	0.02018	0.02052	0.02052	0.02088	0.02088	0.02106
Per cent Zinc Oxide (Approximate)	50	65	65	82	82	88
Per cent PbSO ₄ -PbO (Approximate)	50	35	35	18	18	12
Per cent Basicity (Expressed as Lead Oxide-PbO)	12-14	6.5-8.5	6.0-7.5	7-7.5	6-7	0.5-1.0
Specifications	ASTM	D80-41	D80-41	D80-41	D80-41	D80-41
	Federal		TT-Z-321a	TT-Z-321a		

The properties you want most in your exterior paints can begin right here . . . with the AZO leaded zinc oxides you need for durability and mildew resistance in your primers and top coats.

AZO cofumed leaded zinc oxides have excellent mixing and dispersion qualities and produce the lowest consistency in paint. AZO blended type leaded zinc oxides generally give higher consistency and improve color. Both types have uniform consistency within grades—help minimize mixing problems in your plant.

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NEW EQUIPMENT AND MATERIALS

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



OHIO

ROLLER STANDS

Features Rubber Rollers

A series of roller stands, manufactured for plant or laboratory milling, features lathe cut rubber rollers with adjustable speeds and sealed ball bearings to promote smoothness and consistency. Available with open or sealed motor, the roller stand is made of heavy gauge steel. **Ohio Kilns**, Dept. PVP, Granville, Ohio.

NEW GRINDING MEDIUM

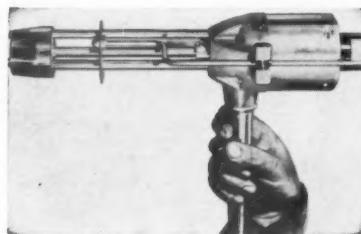
Six Different Sizes

A grinding medium made of alumina-based materials with a non-metallic bond of high density, has been developed for use in ball mills. The material is produced in six different sizes of balls ranging from $\frac{3}{4}$ -inch to 2-inches in diameter. The manufacturer claims that its isostatic pressing process insures uniform density throughout the ball and increases its wearing qualities. **American Refractories & Crucible Corp.**, Dept. PVP, North Haven, Conn.

VINYLTOLUENE RESINS

Quick Drying

A series of vinyltoluene copolymers, developed to meet the need for inexpensive, quick drying vehicles with a wide range of coating applications, has recently been made commercially available. The products, called "Vintols", are recommended by the manufacturer for industrial enamels, metal decorating finishes, drum enamels, paper coatings, spar varnishes and wood finishes, as well as aerosol enamels. **Degen Oil & Chemical Co.**, Dept. PVP, P.O. Box 5C, Jersey City, N. J.



BARRINGTON

PORTABLE MIXERS

Air Driven

Air driven portable high speed mixers for laboratory, pilot or small batch applications are available. These special light weight units are particularly useful where highly inflammable or explosive materials need to be mixed, emulsified, dispersed or homogenized. The mixers incorporate the closed/open turbine convertible feature offered on Standard size mixers and are available to handle capacities from 3-gallons to 25-gallons. $\frac{3}{4}$ H.P. models weigh only nine pounds. **Barrington Industries, Inc.**, Dept. PVP, 185 Union Ave., Providence 9, R.I.

ACRYLATE MONOMERS

Low Inhibitor Level

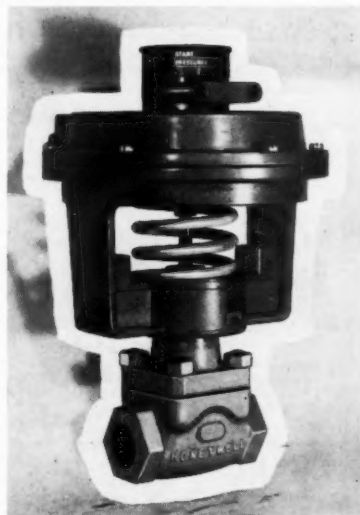
Methyl acrylate and ethyl acrylate monomers are now available which have an inhibitor concen-

tration of only 15 parts per million. The manufacturer reports that tests indicate maintenance of stability under extreme storage conditions. They withstand heating to 130°F. for at least 30 days without evidence of polymer formation. **Rohm & Haas Co.**, Dept. PVP, Washington Sq., Philadelphia, Pa.

AIR CONTROL VALVE

Low Flow

A line of compact valves for regulating the flow of small streams of air, water, steam or chemical solutions has been introduced for industrial process and commercial building applications. Called the 1400 series, the line includes a low-cost, lightweight, diaphragm actuated model and two models which are electrically actuated. The valves are available in three body sizes ($\frac{1}{2}$, $\frac{3}{4}$ and 1-inch) with a wide selection of reduced inner ports to Cv's from .025 to 11, and in a full range of material and body ratings with both screwed and flanged connections. **Minneapolis-Honeywell Regulator Co.**, Dept. PVP, Fort Washington, Pa.



HONEYWELL

**NEW
MATERIALS — EQUIPMENT**

HYDROCARBON RESIN

Emulsion Form

A new, low-cost hydrocarbon resin emulsion, Piccopale A-55, is being produced as a type of reinforcing resin for all types of latex. Use of this resin at the 20% replacement level yields lower cost, higher tensile strength, improved modulus, elasticity, and increases tack in uncured films. **Pennsylvania Industrial Chemical Corp.**, Dept. PVP, 3460 Wilshire Blvd., Suite 604, Los Angeles 5, Calif.

GLOSS CONTROLLERS

Reduces Grinding Time

A series of gloss controllers for clear and pigmented finishes, with the trade-name "Phlats", has been developed for the purpose of achieving a consistent sheen in pigmented or clear satin finish formulation. It is claimed that the new product will eliminate a costly grinding operation and insure non-settling and non-seeding in the most critical formulas. The line includes controllers for polyurethane finishes, short oil alkyds, medium oil alkyds, nitrocellulose lacquers, and epoxy esters. **Lo Bo Chemical Products Co.**, Dept. PVP, 214 Northfield Rd., Bedford, Ohio.



ECONOMY

PLUG VALVES

To 300 p.s.i.

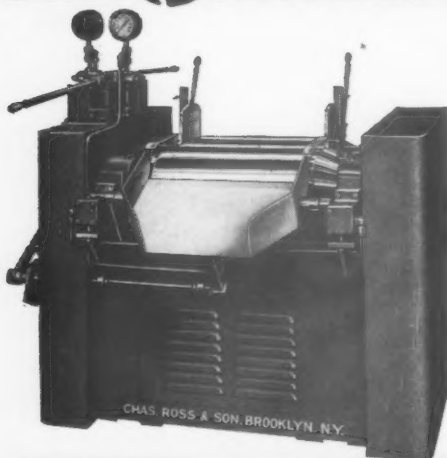
A line of flush-type plug valves with receding or extending plugs is being offered to the chemical, paint, plastics, and other processing industries on a quick-delivery basis. Manufacturer claims that valve design eliminates "pocket" between the vessel and outlet pipe where unprocessed materials may collect. The plug valves can be furnished in steel, or any major alloy, in plain or jacketed styles. The line is available for working pressures to 300 psi, with valves for higher pressures on a custom basis. They can be modified to give discharge at almost any angle, to provide a long body for use with direct-fired vessels, or to include pneumatic or hydraulic cylinder operators or extended shafts. **Economy Mfg. Co.**, Dept. PVP, Railroad St., Box 755, E. Liverpool, Ohio.

CHROME YELLOWS

Available in Three Shades

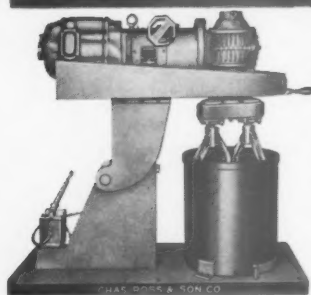
Three regent yellows, said to be a considerable improvement in light-fastness and alkali resistance over the regular chrome yellows, have recently been developed. The improvement in light resistance is such that it is necessary to expose the regent yellows at least 50% longer in order to obtain a given amount of darkening, the Co. said. Chrome yellows are available in three shades: Regent Yellow Primrose 12176, Regent Yellow Light 12177 and Regent Yellow Medium 12178. **Sherwin-Williams Co.**, Dept. PVP, 260 Madison Ave., New York 16, N. Y.

NEW Ross HIGH SPEED THREE ROLL MILLS WITH — ONE POINT HYDRAULIC ROLL ADJUSTMENT



- 1 Pressure indicating gauges provide greater ease in properly setting rolls, and less skill or experience is required by operator.
- 2 Roll pressure settings can be recorded for exact reproduction of material assuring standardization of product.
- 3 Special equalizers assure positive parallelism of roll faces at all times for uniform dispersions and minimum maintenance costs.
- 4 Mills have quick roll release with safety overload feature, and are convertible for either fixed or floating center roll operation. 2½x5, 4½x10, 6x14, 9x24, 12x30, 14x32, and 16x40" sizes.

PRODUCTION SIZE DISPERSION TYPE CHANGE CAN MIXERS WITH — DOUBLE PLANETARY STIRRER ACTION



- Stirrers with special blade angles and very close clearances revolve on their own axis and also around can developing 12 intense compressive and shearing actions with each revolution to break down and disperse agglomerates.
- Variable speed for infinite range of stirrer speed control.
- Simplified vertical hydraulic lift for greatest ease in cleaning down stirrers.
- Non-revolving can is completely enclosed during mixing for safety and to reduce solvent loss. Cans can be jacketed or fitted with slide gate when required. Cans are easily positioned or removed from Mixer.
- Extra heavy construction and standard type motor eliminate costly downtime. Oversized motor drives can be provided for kneading and mixing extremely heavy materials. 1, 2, 3, 4, 6, 8, 12, 25, 50, 65, 85, 125 and 150 gallon sizes.

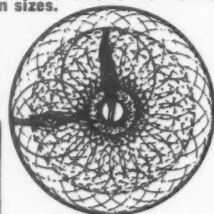
Area of can contacted by stirrers during only one revolution of stirrers around can (2 seconds). Position of stirrers advances 4½° with each successive revolution to sweep entire area and all points on sides of can. Stirrers overlap each other as well as center of can.

Write for further information!

CHARLES ROSS & SON CO., INC.

ESTABLISHED 1869

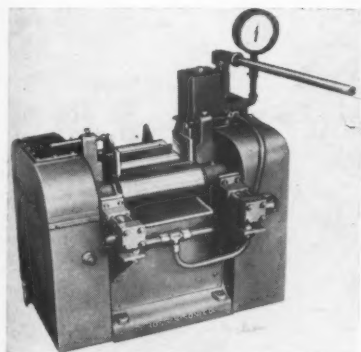
148 CLASSON AVE., BROOKLYN 5, N. Y.



NEW
MATERIALS — EQUIPMENT

THREE ROLL MILL
One Point Adjustment

High speed three roll mill features simplified one point hydraulic adjustment of rolls and pressure recording gauge. The front and back rolls can be adjusted separately, while for floating center roll operation, the mill is provided with a single hydraulic adjustment instead of the four separate points of adjustment found on conventional mills. Special equalizers are incorporated to assure equal pressure on both ends of rolls at all times for parallel roll adjustment and uniform dispersion. An overload feature is built into each mill to prevent damage to the hydraulic system if foreign matter falls into the mill. **Charles Ross & Son Co., Dept. PVP, 148-156 Classon Ave., Brooklyn 5, N. Y.**



ROSS

GAS SCRUBBER SYSTEM
Reduces Liquid Carryover

A new gas scrubber system which reportedly reduces liquid carryover to .00002 gallons per 100 CFM, has recently been developed and is available to industry. This packaged unit, which couples the familiar SK ejector-venturi gas scrubber with an inertia-impact type separator, provides improved particle separation as well as increased moisture elimination. The moisture elimination has been made possible by a baffling system in which the spacing of internal baffles is rigidly controlled. **Schutte and Koerting Co., Dept. PVP 2255 State Rd., Cornwells Heights, Bucks Co., Pa.**

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**PREMIUM
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Since their introduction by Williams six years ago, Kroma Reds have found increasing use in many products because they are the *cleanest*, and *brightest*, of all the synthetic iron oxide pigments... *yet they sell at standard prices!* Six shades are now made by the patented Williams process, ranging from the light salmon RO-3097 to the deep clean maroon RO-8097. You use them in oil paints, enamels, emulsion paints, leather finishes, floor coverings, textile finishes, concrete products—or wherever you need a bright, stable, permanent red. In case you have overlooked the Kromas, we suggest that you get in touch with us for technical literature and samples. Address Dept. 23, C. K. Williams & Co., 640 N. 13th St., Easton, Pa.

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N E W
MATERIALS — EQUIPMENT

HYDRAULIC PALLET TRUCK Eliminates Greasing

New hand hydraulic pallet truck named "Lo-Lift", features leak-proof hydraulic unit, formed steel and welded construction, steel wheels and rollers, greaseless bearings in all pivot points, and a variety of tires. Trucks are available in widths of 20½-inches, 27-inches and with fork lifts of 36-inches, 42-inches and 48-inches. **Charles W. Meldram Co.,** Dept. PVP, 230 Park Ave., New York 17, N. Y.



MELDRAM

ALUMINUM ALLOY In Powder Form

Medium carbon grade of aluminum manganese alloy in powder form has the physical appearance of aluminum, but is of greater density.

Laboratory and field tests conducted indicate possibilities of this product in paint and plastic industries, according to the manufacturer. One of these possibilities is a filler in paint, plastic putty and cements.

Frank Samuel & Co., Dept. PVP, 2 Penn Center Plaza, Philadelphia, Pa.

ANTI-FOAM AGENT Prolonged Effectiveness

A new antifoam agent, compatible with all emulsion paint systems presently in use, has recently been announced. According to the manufacturer, the new product, called Nilfoam C, retains its effectiveness even after six months of storage in the can. **Naftone, Inc.,** Dept. PVP, 425 Park Ave., New York 22, N. Y.

POLYMER SYSTEM

Alkali Resistance

A polymer, designed for alkali resistance and acid sensitivity, is Morton Chemical Co.'s new bid to meet major needs in formulation of polishes, surface coatings and industrial specialties. The company says that floor polish systems containing the new polymer, titled "Lock and Key", are resistant to water and detergent scrubbing; yet when removal is desired, a specific dilute acid formulation will strip the polish from the floor. **Morton Chemical Co.,** Dept. PVP, 110 N. Wacker Dr., Chicago 6, Ill.

CASE PACKER

For Side-Loading Cases

A new case packer for side-loading cases was recently introduced. Designed to accommodate side loading 4-1 gallon paint cartons, 2-1 gallon paint cartons, and 6 quart cartons, the machine operates at speeds up to 30 gallons per minute. The packer orients each gallon can so that the ears go into carton corners, pneumatically pushes 2 gallons per stroke into the case and discharges it at high speed on to the case sealing operation. **Sheppard Machinery, Inc.,** Dept. PVP, Box 134, Oyster Bay, N. Y.

Make better caulks with INDOPOL Polybutenes

Penetration test, one of many tests developed at Amoco for evaluating caulk formulations.

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Please ☐ Information on INDOPOL for Caulks.
send me ☐ Price and Shipping information.
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AMOCO

NEW
MATERIALS—EQUIPMENT

**FLAMMABLE LIQUID DISPENSER
Prevents Spillage**

A mobile safety dispenser for flammable liquids incorporates a transfer pump fitted with a 6-foot neoprene hose which has a sealed-in static grounding wire to prevent static buildup during transfer operations. A vacuum breaker mechanism in the pump instantly shuts off liquid flow and prevents spillage. The pump handles up to five gallons per minute. The 60 gallon steel tank, tested to 25 lbs.

psi, is internally baffled to prevent liquid surge when the unit is in motion. Four ball bearing, rubber tired wheels provide easy mobility. Rear wheels are swiveled, enabling the dispenser to maneuver in close quarters. Unit is equipped with a hand brake, front bumper and a handle. Liquid level is indicated by a magnetic liquid level gauge mounted on top of the tank. **Pro-tectoseal Co.**, Dept. PVP, 1920 S. Western Ave., Chicago, Ill.

POLYMER EMULSIONS

Acid Soluble

What is described as "a new

species of polymer emulsions," NeoCryl A-410 and NeoCryl A-400, have been introduced by Polyvinyl Chemicals. Both emulsions are not affected by water, soap or alkaline detergents even after repeated exposure, yet can be quickly and easily removed with mild acidic cleaners, according to the manufacturer. The new emulsions contain functionally active groups that can interact with carboxyls, acid chlorides, acid anhydrides, epoxies, aldehydes, lactones, and sulthydrils. Apparent applications would include coatings for paper, adhesives, textiles, leathers, and floor and shoe polishes. **Polyvinyl Chemicals, Inc.**, Dept. PVP, 26 Howley St., Peabody, Mass.

IRON OXIDE

Meets Government Specifications

A new iron oxide called "1681", for industrial, specification, and maintenance paints, that meets government standards, has recently been introduced. Among the advantages claimed for the product is that it cuts costs through its exceptionally high (96%) iron oxide content, giving the formulator more latitude in the additional use of low cost extenders where applicable. Ease of grind is said to be another feature. **Reichard-Coulston, Inc.**, Dept. PVP, 15 E. 26th St., New York 10, N. Y.

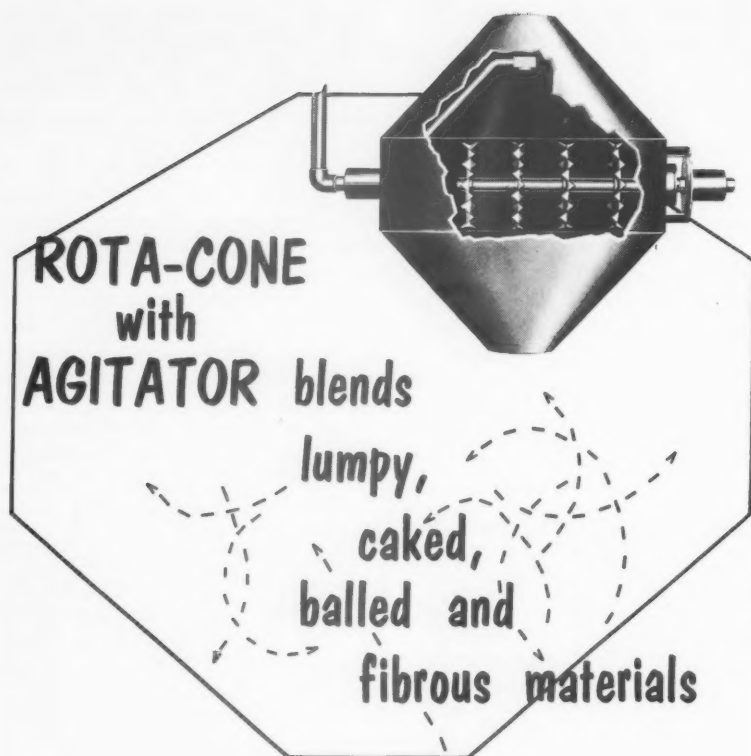
ANTI-FOULING INGREDIENT

Field Tested

Metal & Thermit Corp. has supplied 125 boatowners with paint containing a new anti-fouling ingredient. After applying the paint to the bottom of his boat, each participant is asked to fill out a questionnaire giving such information as boat specifications, frequency of use, conditions under which the paint was applied and his evaluation of the product. The active ingredient in the paint is the agent, bis (tri-n-butyltin) oxide. Extensive field testing of the product has been carried on since early in 1960. According to the manufacturer, the results of these tests have been to show that the agent is toxic to all forms of marine fouling organisms. The new paint ingredient is colorless and will blend into vehicles without grinding. **Metal & Thermit Corp.**, Dept. PVP, Rahway, N. J.

At least five important product quality improvements can be achieved by formulating caulks with INDOPOL Polybutenes. (1) Caulks can be formulated with virtually permanent flexibility. (2) Resistance to cracking is improved. (3) Resistance to shrinkage is improved. (4) Adhesion is improved. (5) Staining is reduced or eliminated

INDOPOL Polybutenes are liquid isobutylene polymers available in a wide range of viscosities. A number of viscosity grades are especially suited to caulk formulating. Get more information about INDOPOL Polybutenes in caulking compounds from your Amoco Chemicals representative or use the handy coupon.



The Paul O. Abbé Rota-Cone Blender, with internal agitator, readily blends lumpy, caked, balled and fibrous materials.

For example, many fine mesh powders become caked into relatively firm lumps. The Rota-Cone blender breaks up and restores such caked or lumped materials to their original fineness for blending with other powdered ingredients.

Again where caked powders are treated with a liquid additive, the internal agitator restores the powder to its original fineness, before the atomized spray is added. Breaking, blending and liquids-addition are all accomplished in one unit.

Some materials tend to form balls while being blended. The internal agitator prevents this "balling" and permits quick, thorough blending.

Whatever your blending needs, Paul O. Abbé Rota-Cone Blenders can readily meet them.

For complete details of Paul O. Abbé Blenders, write today for our 12-page Catalog C-1.

PAUL O. ABBÉ

389 CENTER AVENUE LITTLE FALLS, NEW JERSEY

BALL & PEBBLE MILLS • DRY & PASTE MIXERS • DRYERS & BLENDERS

NEW MATERIALS — EQUIPMENT

STEEL SHIPPING CONTAINER Dome Style

Dome style utility can named E-Z Stacker is said to assure product protection and dependability. Can has high dome bottom with spout which inverts for shipping. Design is intended to promote snug storage with a minimum loss of space. Dome top design prevents bail handle from falling forward into pouring stream. Manufacturer lithographs cans according to customer's specifications. Steel Package Div., **Geuder, Paeschke & Frey Co.**, Dept. PVP, 324 N. 15th St., Milwaukee 1, Wis.

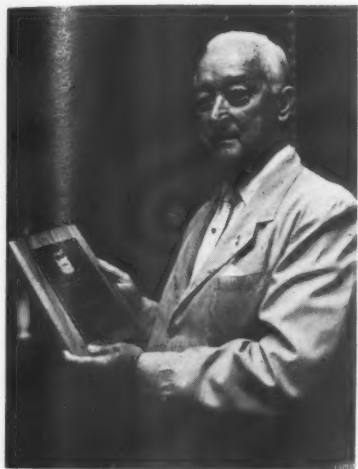
CASE GLUER Pressure Fed

Case gluer, recently introduced, applies glue in uniform stripes instead of solid coatings. Manufacturer's tests show that the stripes set faster than coatings and offer equal sealing strength. The unit, designated Type SK-455, feeds glue from a reservoir under low pressure, through hoses and applicators, directly onto case flaps. Glue is exposed to air only at the moment it is applied. When the unit is not in use, applicators rest on moist pads which prevent glue from hardening on or inside them. Width and length of glue pattern are pre-set and remain constant. **Emhart Mfg. Co.**, Portland Division, Dept. PVP, Portland, Conn.

EXPERIMENTAL THICKENER Increased Viscosity

Pilot plant quantities of an emulsion with exceptional thickening powers are now available, according to the manufacturer. The product, known as experimental thickener ASE-95, is an acid-containing, acrylic emulsion copolymer, said to be particularly useful for thickening aqueous and polar-solvent systems such as those commonly used for paint and specialty coatings. When neutralized and diluted, the product clarifies and becomes very viscous. Once neutralized, however, the solution cannot be reverted to emulsion form as a reduction in pH below six will precipitate the polymer. **Rohm & Haas Co.**, Dept. PVP, Washington Sq., Philadelphia 5, Pa.

NEWS



The Portland (Ore.) Paint, Varnish and Lacquer Assoc. recently presented President Joseph F. Battley of the National Association a plaque for meritorious services to the paint industry.

Symposium on Geratology of Paint Films to be Held

A symposium, titled, "After Dry, What?," sponsored by The Cleveland Society for Paint Technology, will be held on September 21 through 23 at the Cleveland Engineering and Scientific Center, 3100 Chester Ave., Cleveland, Ohio.

The speakers are experts in their various fields. Subjects to be discussed include: A review of modern developments in the study of degradation by oxidation, and by polymerization of unsaturated compounds; The effects of environment on the film; Instrumental evaluation of film degradation. The entire symposium will consist of three half-day sessions.

DuPont To Expand Output Of Titanium Dioxide

Du Pont will expand the output of titanium dioxide pigment at its New Johnsonville, Tenn., plant by 30 per cent in the next 12 months.

Construction of additional facilities at New Johnsonville is the first step in a planned program of major expansions at the plant which began production of titanium dioxide in February, 1959.

Mobay Plans Construction of Additional Plant Facilities

Plans to construct additional multi-purpose plant facilities for the manufacture of a broad range of organic isocyanates were announced recently by J. D. Mahoney, president of Mobay Chemical Co.

The new plant, which will have a production capacity of several hundred tons per month, will be adjacent to Mobay's tolylene diisocyanate plant at New Martinsville, W. Va., which is currently being expanded from 40 to 50-million pounds capacity per year. Construction will begin immediately, with completion scheduled for early 1962.

Chemicals to be produced in commercial bulk quantities in the new plant will include meta-chlorophenyl isocyanate, octadecyl isocyanate, p,p'-diphenylmethane diisocyanate, para-chlorophenyl isocyanate, phenyl isocyanate and other intermediate chemicals related to urethane or isocyanate processing.

Hercules Appoints Resins Distributor

Moreland Chemical Co., Spartanburg, South Carolina, has been appointed a distributor of synthetic resins by the Pine and Paper Chemicals Dept. of Hercules Powder Co., Wilmington, Del. Moreland, who also handles Hercules' pine chemicals, will be distributors of synthetic resins for protective coatings, inks, adhesives, floor tiles and other applications.

Committee For International Technical Assistance Formed

The Federation of Societies for Paint Technology has announced the formation of the Committee for International Technical Assistance. The function of the committee will be to render, on request, technical assistance to countries with an infant paint industry, or to countries about to start such an industry. The technical cooperation will be accomplished by correspondence, the sending of experts from federation ranks to those countries requesting aid, and cooperation with foreign technicians who visit the U. S. Preliminary inquiries overseas have resulted in favorable responses to the proposed program.

Resin-Based Aluminum On Market Nationally

A new polyester resin-based aluminum for exterior use is being marketed nationally by Illinois Bronze Powder Co. Named Ruf-Top, the coating contains an asbestos fibre which allows it to expand or contract with temperature changes underneath its hard sheet aluminum surface. Rollers or brushes may be used to apply Ruf-Top over felt, paper, composition, cement, cinder block, brick, stone or metal surfaces. It is available in white, green, red, aluminum, blue and copper.

Maas & Waldstein Marks 85th Anniversary

The Maas & Waldstein Co., Newark, N. J., Chicago and Los Angeles, this year, celebrates its 85th anniversary as a creator and producer of industrial finishes. Established in 1876, this renowned paint Co. has created some 50,000 industrial finishes in nearly a century of business and research.



Gustave Klinkenstein, President, Maas & Waldstein

Recent formulations have been discovered by Maas & Waldstein chemists in the fields of polyester resins, isocyanates and heat, salt and humidity resistant silicone resins for use in ovens, ranges, furnaces, motors, boilers, and chemical equipment; odorless, non-toxic vinyl resins with high resistance to chemical corrosion, acrylic resins for heat resistance, color retention and weatherability, and a whole new generation of modified resins that can withstand almost any environmental condition.

PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending \$1.00 for each copy desired (to foreign countries \$1.50 per copy) to the publisher.

For copies of patents which are out of print in the Patent Office, necessitating a reprint, the above charges will be \$1.50 and \$2.00 respectively.

Primer Coating Compositions

U. S. Patent 2,990,294. Lamar E. Long, Doylestown, Pa., assignor, by mesne assignments, to Minnesota Mining and

Manufacturing Company, St. Paul, Minn., a corporation of Delaware.

A composition comprising a volatile organic dispersing vehicle, a solid perfluorohaloolefin polymer selected from the group consisting of chlorotrifluoroethylene homopolymer, chlorotrifluoroethylene-vinylidene fluoride copolymer, and perfluoropropene-vinylidene fluoride copolymer, and a cobaltous oxide frit, said composition containing between about 5 and about 60 parts by weight of cobaltous oxide frit per 100 parts by weight of perfluorohaloolefin polymer.

Yellow Pigments

U. S. Patent 2,992,123. Clarence A. Seabright, Lakewood, Ohio, assignor to The Harshaw Chemical Company, Cleveland, Ohio, a corporation of Ohio.

Process of making a clean yellow pigment comprising calcining in a non-

reducing atmosphere at temperatures in the range from 1100° C. to 1500° C. a batch consisting essentially of materials capable of yielding from 99.9 to 30 parts by weight of oxides of zirconium and from 0.1 to 10.0 parts by weight of oxides of praseodymium.

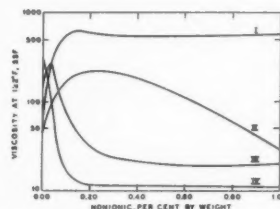
Surface-Active Esters

U. S. Patent 2,987,490. Willard H. Kirkpatrick, Sugar Land, and Virgil L. Seale, Alice Walker and Joe B. Love, Houston, Tex., assignors to Visco Products Company, Houston Tex., a corporation of Delaware.

An ester having a molecular weight of at least 1500, said ester formed by the esterification of (a) a polymerized polyethenoid fatty acid mixture consisting of at least 70% trimerized fatty acid, the trimerized acid having a molecular weight of at least 834 and being a tri-carboxy acid, with the remainder of said mixture being a dicarboxy dimer of the polyethenoid fatty acid in said trimerized fatty acid, and (b) a polyoxyalkylene organic compound having an esterifiable hydroxy group in the polyoxyalkylene chain, said polyoxyalkylene compound having a molecular weight of at least 400 and the alkylene groups in the polyoxyalkylene portion of the polyoxyalkylene compound having 2-3 carbons.

Asphalt Emulsion

U. S. Patent 2,993,004. Edward W. Mertens, El Cerrito, Calif., assignor to California Research Corporation, San Francisco, Calif., a corporation of Delaware.



An improved high residue asphalt emulsion of low viscosity consisting essentially of an anionic soap asphalt emulsion and from 0.05 to 2.0 percent by weight of polyethylene glycol tertiary alkyl thioether having from 5 to 10 polyethylene glycol units and from 8 to 18 carbon atoms in the tertiary alkyl group, said thioether being sufficient to lower the viscosity of the emulsion and said anionic soap asphalt emulsion being prepared by mixing from 40 to 80 percent by weight of molten asphalt with from 20 to 60 percent by weight of aqueous solution of from by weight of aqueous solution of 0.05 to about 0.30 percent by weight of potassium hydroxide so as to saponify acids in the asphalt, the aforesaid proportions being based on the total asphalt emulsion.



PURE TITANIUM DIOXIDE

Rutile and Anatase

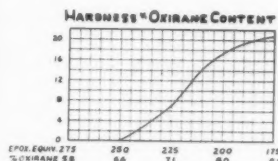
**R. T. VANDERBILT
COMPANY, INC.**

230 PARK AVENUE NEW YORK 17, N. Y.

PATENTS

Epoxidized Resin

U. S. Patent 2,993,920. Walter M. Budde, Jr., and Gale W. Matson, Minneapolis, Minn., assignors to Archer-Daniels-Midland Company, Hennepin, Minn., a corporation of Delaware.



U. S. Patent 2,993,920

A resinous material comprising essentially the reaction product of substantially 100 parts epoxidized liquid aliphatic higher fatty acid ester material as the major epoxy constituent containing 12-26 carbon atoms in the fatty radical having an iodine value higher than 140 before epoxidation and after epoxidation having a plurality of internal oxirane groups, equivalent to at least about 8% internal oxirane value, said epoxidized ester being neutralized and containing from about 10 parts to 2000 parts per million of a mono-valent alkali metal ion, and the anhydride of a polycarboxylic acid in the molar ratio of about .5 to about 1.2 mole anhydride per mole internal oxirane in said fatty ester.

Modified Alkyd Resins

U. S. Patent 2,993,873. Raymond L. Heinrich, Baytown, Tex., and David A. Berry and Richard J. Dick, Columbus, Ohio, assignors, by mesne assignments, to Esso Research and Engineering Company, Elizabeth, N. J., a corporation of Delaware.

An alkyd resin composition comprising the intercondensation product of about 3.1 to about 3.4 mol equivalents of a polyol containing an average of from about 2.5 to 4.5 hydroxyl groups per molecule with from about 2 to 2.5 mol equivalents of a polycarboxylic acid and, correspondingly, from about 1 to about 0.5 mol equivalent of a modifier component consisting of about 20 to 80 mol percent of an unsaturated glyceride oil fatty acids portion and, correspondingly, about 80 to 20 mol percent of an aromatic monocarboxylic acid portion containing, correspondingly, from about 100 to about 10 mol percent of an acid selected from the group consisting of m-hydroxy benzoic acid, p-hydroxy benzoic acid, and mixtures thereof.



COLOR CONTROL

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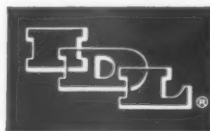
Courtesy of The California Ink Company, Berkeley, Calif.

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TECHNICAL

Bulletins

BASIC SILICATE WHITE LEAD

A brochure on the use of basic silicate white lead in water emulsion paints for wood surfaces, has just been released. The 12-page brochure is illustrated and contains tables and formulae necessary to an understanding of the subject. **Eagle-Picher Co.**, Chemicals and Metals Div., Dept. PVP, American Bldg., Cincinnati 1, Ohio.

CARBON BLACK

A new six-page booklet entitled, "The Magic of Black," discusses in layman's terms, what carbon black is, how it was first used, how it is used today, and how it is manufactured. It explains the channel and furnace processes in both general and technical terms and is illustrated by schematic flow charts describing both processes. **United Carbon Co.**, Dept. PVP, 410 Park Ave., New York 22, N. Y.

SILICONE FLUIDS

A new technical reference describes the broad range of applications of major silicone fluids. Designated S-9, the 20-page, two color publication differentiates between available grades of silicone fluids according to viscosity and classifies them on the basis of physical properties. Booklet contains an index permitting the user to select the fluid he is looking for on the basis of the properties required. Also included are a physical data summary chart and a silicone fluid selector. The booklet is illustrated with photos and tables. **General Electric Co.**, Dept. PVP, Watford, N. Y.

LABORATORY INSTRUMENTS

New illustrated series of booklets describes various laboratory instruments and appliances such as viscosimeter, sieve shaker, and their various attachments. Booklets include all specifications, methods of operation, uses and prices. **Fisher Scientific Co.**, Dept. PVP, 384 Fisher Bldg., Pittsburgh 19, Pa.

FILTERS

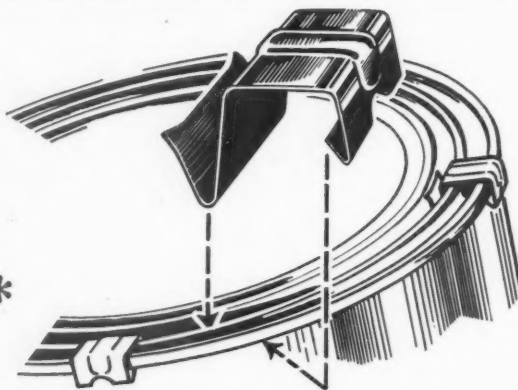
Four-page, illustrated folder describes the interchangeable respiratory protection provided with the M-S-A Gasfoe and M-S-A Dustfoe. Bulletin describes how one facepiece is used with a variety of filters and chemical cartridges to protect against dust concentrations, radioactive particulate, metal fumes, organic vapors, acid gases, ammonia, and other airborne respiratory hazards. A guide to the selection of the correct filter is also included. **Mine Safety Appliances Co.**, Dept. PVP, 201 N. Braddock Ave., Pittsburgh, Pa.

SILICONE ANTIFOAMS

Eight-page, illustrated booklet details the uses of silicone antifoam agents in industry, as well as their suitability in food processing and packaging. Prescribed levels for their use are given in tables of properties. The data is applicable to foam problems encountered in both aqueous and non-aqueous systems. **Hodag Chemical Corp.**, Dept. PVP, 7247 N. Central Park, Skokie, Ill.

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PROCESSING CHEMICALS

A four-page bulletin listing a complete line of processing chemicals and describing uses for each, has recently been published. Categories included are surfactants, hydrosulfates and sulfoxylates, defoamers, resin and wax emulsions, water soluble lubricants, water soluble resins, softeners, and gas-fading inhibitors. Also listed are enzymes, metallic soaps, stabilizers, and inorganic compounds. **Nopco Chemical Co.**, Dept. PVP, 60 Park Pl., Newark 1, N. J.

ALKYLATED PHENOLS

A bulletin describing general physical and chemical properties, structural formulas, and major uses and applications of four alkylated phenols, has recently been made available. The four phenols described are: para-tertiary-butylphenol, para-tertiary-amylphenol, 2,4-di-tertiary-amylphenol, and 2,4-di-tertiary-butylphenol. Infrared absorption spectra are included and a typical resin reaction is described. **Koppers Co., Inc.**, Dept. PVP, Koppers Bldg., Pittsburgh 19, Pa.

SUCTION PUMPS

Eight page bulletin illustrates a new type GBH Close-Coupled End-Suction Centrifugal Pump. Included are cross-section, selection chart, dimensions, optional assembly positions, parts identification, limitations chart, and specifications. Aurora Pump Division, **The New York Air Brake Co.**, Dept. PVP, Aurora, Ill.

PLYWOOD STANDARD

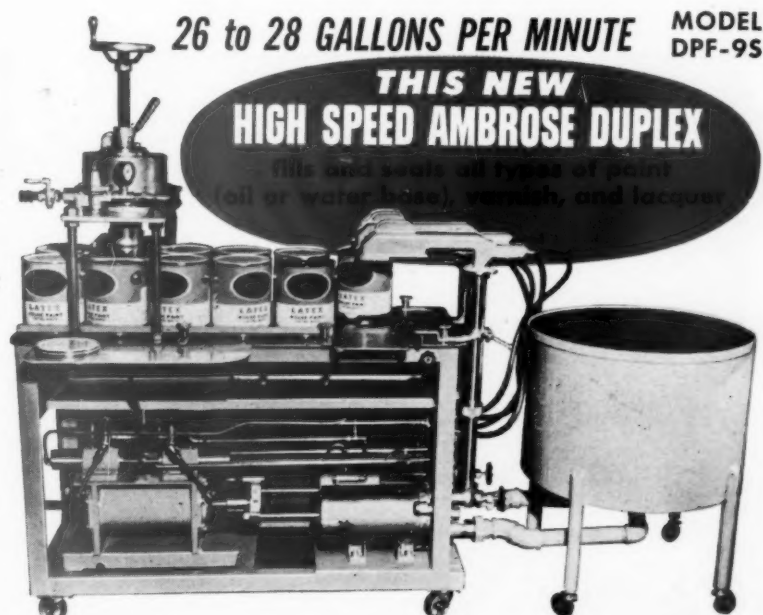
Minimum specifications for four types of hardwood plywood are now available in a printed pamphlet. The pamphlet, designated Commercial Standard CS35-61, covers tests, densities, standard thicknesses, widths and lengths, tolerances, workmanship, inspection, grade marking and certification, method of ordering, and nomenclature and definitions. The minimum specifications are based on the water resistance and durability of the bond, in five standard grades and one premium grade. Copies may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington 25; D. C., for 15-cents.

ACIDS AND ANHYDRIDES

A 48-page booklet describing the properties and uses of organic acids and anhydrides, has recently been published. The booklet contains comprehensive data on acetic, propionic, butyric, 2-ethylbutyric, 2-ethylhexoic, acrylic, sorbic, valeric, and isodecanoic acids; acetic, propionic, and butyric anhydrides. Included is information on physical properties, constant-boiling mixtures, specification limits, test methods, storage, handling, and shipping, toxicological properties, and selected literature references. **Union Carbide Chemicals Co.**, Dept. PVP, 270 Park Ave., New York 17, N. Y.

COLOR REPORT

Tint-Ayd Color Report shows the pastel color range, from yellow to blue, obtainable with six Tint-Ayd dispersions and four intermixes. The six dispersions are: quinacridone scarlet, red magenta, carbazole violet, phthalo blue and permanent primrose yellow. All of these pigments are lightfast, lead-free, non-bleeding and alkali resistant. They are recommended by the manufacturer for exterior use in extreme dilution as well as for use in baking finishes. **Daniel Products Co.**, Dept. PVP, 400 Claremont Ave., Jersey City 4, N. J.



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POLYVINYL ALCOHOLS

A bulletin has just been issued which presents a full discussion of fully hydrolyzed polyvinyl alcohols. The first section treats the use of fully hydrolyzed polyvinyl alcohols in the manufacture of paper, adhesives and textiles, while the second section covers physical properties and handling, including modifications by precipitants and extenders. Numerous graphs, tables and charts present data of interest to chemists and engineers in the processing fields. **Airco**, Dept. PVP, 150 E. 42nd St., New York, N. Y.

CONVEYORS

Sixteen-page brochure explains

in detail, the "warehousing" approach to management of materials flow. Illustrating equipment and techniques for live storage and transportation of raw materials and finished products, the publication offers ideas for manufacturers, wholesalers and retailers, based on the application of warehousing science to problems of materials management. **Rapids-Standard Co., Inc.**, Dept. PVP, 342 Rapis-tan Bldg., Grand Rapids 2, Mich.

MOLECULAR SIEVES

Recently published bulletin contains a list of all currently available Chemical-Loaded Molecular Sieve products. The listing includes

products obtainable in experimental and commercial quantities and classifies them according to the type of chemical that is loaded on the sieve. Information is also provided on the various types of compounds that generally cannot be loaded on molecular sieves. **Linde Co.**, Dept. PVP, 270 Park Ave., New York 17, N. Y.

CONVERSION FACTORS

A recently published wall chart of conversion factors should prove a handy guide for engineers, shop men and other executives. Included are common conversions such as inches to centimeters or watts to H.P., as well as many others that are difficult to locate in reference manuals. Some examples are atmospheres to Kgs/sq. cm, cm/sec to miles/hr, cu. ft. to liters, microns to meters, quintal to lbs., etc. **Precision Equipment Co.**, Dept. PVP, 4411 E. Ravenswood Ave., Chicago 40, Ill.

SHIPPING COSTS

A 15-page booklet entitled "35 Ways to Reduce Your Shipping Costs" has recently been published. The booklet contains 35 suggestions for keeping shipping costs at a minimum as well as seven ways to expedite motor carrier shipments. The booklet was written by Raymond F. Bohman, Jr., a partner in an Industrial Traffic Consultant firm. The pamphlet is available at a cost of one-dollar from **The Institute for Business Research, Inc.**, 49 W. 57th St., New York 19, N. Y.

DUST FILTER

Eight-page bulletin describing the Day type RJ dust filter has recently been issued. The bulletin details, with diagrams, the design and construction of the device. Installations are pictured and described and complete data is given for the dimensions and specifications of single and multiple units. Also listed is the complete line of products for dust control. **The Day Co.**, Dept. PVP 810 Third Ave., N. E., Minneapolis, Minn.



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SOVIET and CZECH ABSTRACTS

New Synthetic Solvents in Manufacture of Paints and Lacquers.

E. I. Gambardella. *Lakokrasochnye Materialy i Ikh Primenenie*, 1960, No. 6, 27-31.

A paper presented at the March 1960 Scientific-Technical Conference on Paints and Lacquers in Yaroslavl. Four types of new synthetic paint and lacquer solvents are described; they were tested at the Yaroslavl "Pobeda rabochikh" plant for solvent power, boiling point, rate of evaporation, color, odor, toxicity, and other parameters. (1) Propyl alcohol may replace the mixture of butyl and ethyl alcohols, with a considerable economical effect. (2) A fraction of higher alcohols boiling in the range 115-130°C gives the lacquer or enamel similar properties as butanol; some Soviet chemical plants employ this fraction in the preparation of plasticizer which was shown to be a good substitute of dibutylphthalate in nitrocellulose lacquers. (3) Nitroparaffins proved to be more effective active solvents than alcohols; the author suggests their use as a medium-boiling active solvent in manufacture of cellulose-ester and volatile-resin lacquers and enamels. (4) Alkyldioxanes were also found to be suitable solvents which can replace butyl acetate; in particular, 4-methyl- and 4,4-dimethyldioxane were employed.

The Influence of Chemical Composition of the Binder on the Effectiveness of Protective Zinc Coatings in Sea-Water Conditions.

A. G. Khanlarova, V. F. Negreev, K. G. Gadshieva, R. K. R. K. Nazirov, and M. A. Ibragimova. *Lakokrasochnye Materialy i Ikh Primenenie*, 1960 No. 6, 16-21.

Description of the preparation and test results of new protective paints consisting of 90% zinc dust (blue powder) and binder; the following binders were tested: epoxy resin ED-6, high-pressure polyethylene, polystyrene prepared from vat-residue of styrene rectification, chlorinated rubber, ethinol, Rubrax, polymethylmetacrylate, bloc-polymerized polystyrene. The stability of these paints was found to depend on the chemical composition of the binder used. A zinc-paint coat of 0.1 mm in thickness, prepared by using polystyrene (from vat residue of styrene rectification), is recommended as primer for bituminous coatings on metallic constructions exposed to corrosion by sea water.

Micro-Determination of Sugars in Pentaerythrite.

A. S. Salova, I. P. Antonova-Antinova. *Lakokrasochnye Materialy i Ikh Primenenie*, 1960, No. 6, 55-56.

A micro-method of determining the total amount of sugars in pentaerythrite in aqueous solution uses the following reagents: $K_3Fe(CN)_6$ and Na_2CO_3 in water; KJ , $ZnSO_4$ and $NaCl$ in water; 3% aqueous solution of acetic acid (free of Fe); and 1% solution of starch. The relative accuracy of the method is 5-10%.

Film-Forming Properties of Mixed Acrylic Polyesters in Presence of Cobalt Salts.

M. M. Mogilevich and M. I. Archipov. *Lakokrasochnye Materialy i Ikh Primenenie*, 1960, No. 6, 12-16.

Description of the synthesis and characterization of two polyesteracrylates: hexam etacrylate(bispentaerythrite) adipate, and hexacrylate(bispentaerythrite)adipate. In presence of cobalt linoleate, both polyesters form films in temperatures of 18-100°C. The effect of temperature, atmospheric composition, and Co-salt residue on the rate of polymerization of polyesteracrylates in film were studied; it is shown that atmospheric oxygen participates in the structure-formation of the film. The inhibiting effect of atmospheric oxygen on film-formation is eliminated by using cobalt linoleate or linseed oil with cobalt naphthenate.

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Determination of Solvent Amounts in Mixtures

J. Rozan, J. Jarusek, and J. Mestenhauser
Scientific Papers of the Institute of Chemical Technology, Pardubice, 1959, 225-230.

The authors have devised a method of approximate determination of content ratios of individual components in mixtures containing two kinds of known solvents. The fast and simple method utilizes a suitably modified burette; it is based on solubility determination of solvents. Such determinations were carried out by authors for solvents used in the protective coating materials; their solubilities in water, saturated NaCl solution, dilute HCl, concentrated H₂SO₄, and in mixture of conc. H₂SO₄ and oleum. (In Czech)

Amperometric Determination of Phenolic Groups in Epoxy Resins.

L. N. Flegontova and V. N. Ginzburg.
Lakokrasochnye Materialy I Khimicheskoye Prikladnoye, 1960, No. 5, 70-73.

The authors tested various systems of electro-conducting media capable of dissolving given amounts of epoxy resin and free bromine, thus forming a homogeneous solution; the latter satisfies the requirements of a polarographic base. Optimum conditions for volt-ampere curves of Br reduction on rotating platinum electrode were found for solutions containing methyl alcohol, dimethylformamide, and also diphenylpropane and epoxy resins. The described method of amperometric determination of small amounts of phenolic groups in epoxy resins is rapid (15-20 mins.) The mean error is 3-6%.

Effect of Particle Size on Properties of PVAc Dispersions

Ph.D. Dissertations submitted to the Institute of Chemical Technology, Pardubice, Czechoslovakia, in 1957-58:

The effect of particle size of polyvinylacetate dispersion on the properties of emulsion paints (B. Davidek); Epoxidized oil as a polyaddition film-forming component (P. Heger);

Effect of volume concentration of pigments on the properties of polyvinylacetate emulsion paints (V. Lavicky);

The effect of polyamide- and polyamine-based hardening additives on the properties of epoxy resins (F. Maruska);

The relationship between constitution and chemical resistance of epoxy resins (J. Novakova);

Study of methods of reducing the down-flow of solventless polyester lacquers (S. Odstrcilikova);

Use and preparation of black polyester solventless coating materials (Z. Velicka);

Comparison of technological properties of polyester and epoxy solventless lacquers (J. Ruzickova);

Study of methods for determining the pigment density (A. Scholzova);

The dependence of technological properties of glycolmaleic acid polyester solventless lacquers on the alternative use of chlorotetrahydrophthalic and endomethylenetetrahydrophthalic acids instead of the modifying orthophthalic acid (M. Vadura); Zinc yellows (J. Kunc).

Effect of Drying Oils On Stabilization of Carbon Black Suspensions

B. N. Shakhkel'dyan. *Kolloidnyi Zhurnal*, 22 (1960), 106-110

A study of the influence of surface-active agents, contained in carbon black, on the viscosity of typographic inks. Measurement of viscosity of unextracted carbon black suspensions in vaseline oil and in mixtures of the latter with drying oil showed that the surface active compounds present in the black enhance the stability of the suspensions. At small drying oil content of the dispersion medium, adsorption takes place predominantly on the most active sites of the carbon black surface, capable of sorbing also the non-polar components of the vaseline oil. The highest stabilizing effect is achieved after saturation of the active sites when the adsorption of the drying oil components reaches the limit. A study of thixotropic structuration in suspensions confirm the assumption of the orientational origin of the viscosity anomalies in the ultimate stabilized systems as well as of the uniform structures of those systems. (In Russian)

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*PATENT PENDING

Purification of Waste Waters in Manufacture of Zinc and Lead Chromates.

M. A. Shtern and G. N. Gorelik. *Lakokra ochnye Materialy i Ikh Primenenie*, 1960, No. 6, 34-38.

The described method of purifying waste waters in production of lead and zinc chromates employs lead salts to precipitate out the sesquivalent Cr. On a preliminary treatment of the wastes milk of lime (to pH 7-8), the purification is rapid and complete; the precipitating agent is used in excess. Satisfactory removal of the lead residues is achieved by treatment with 5-7% milk of lime to pH 10-11 (the waters contained 20-450 mg Pb per liter).

A Rapid Determination of Porosity Of Organic Protective Coatings.

By Z. Hippe and Z. Jedlinski. *Przemysl Chemiczny*, 40 (March 1961), 40-1.

A new, rapid method is proposed to calculate the porosity of protective organic coatings applied to steel or other metallic (aluminum, etc.) surfaces. The method is based on the electrolysis of a solution of sodium chloride, containing phenolphthalein and bromomethyl blue, by a 20V current; one electrode is a platinum wire, the other a metal plate coated with the tested lacquer. A measure of porosity is given by the number of color points formed as a product of the reaction between the indicators and sodium hydroxide in 1-2 seconds. Some experimental findings and values are tabulated.

Titanates—Pigment for Protective Coating Materials

V. Koutnik and Z. Uhlir. *Scientific Papers of the Institute of Chemical Technology, Pardubice*, 1959, 89-97.

A brief description of the preparation of three titanates of practical or potential usefulness in protective coatings: $PbTiO_3$, Zn_2TiO_4 , and magnesium titanates. Experiments carried out by authors show that using suitable mineralizers the titanates may be prepared in temperature range of 500-700°C. The titanates are of considerable interest for the coating industry; some of their properties are given. In mixture with Pb sulfate, $PbTiO_3$ does not change color under action of sulfur compounds, and is highly stable to acid and alkaline media. Using suitable binders, coatings based on titanates retain high gloss, and resist rupture; the properties of titanate pigment pass on a combination of pigments which contain a minimum of 20% by weight of titanates (calculated on total weight of pigments including binders). The photosensitivity of titanates may be eliminated by addition of suitable additives. (In Czech)

Furane Solvents For Coatings

J. Rozan, J. Garusek, V. Polak, and J. Grimmer. *Scientific Papers of the Institute of Chemical Technology, Pardubice*, 1959, 231-236.

The paper discusses the applicability of some furane solvents in the manufacture of protective coatings. While 2-methyltetrahydrofuran and tetrahydrofurfuryl alcohol appear suitable for that purpose, their physiological affects have not been ascertained. 2-methylfuran shows high volatility, inflammability, string odor, and low solvent ability; it is therefore less suitable and not considered as a replacement for acetone. The paper tabulates solubilities of about 20 solvents used in the coating industry. (In Czech)

Estimation of Hiding Power of White Pigments and Paints According to the Kubelka-Munk Theory.

By O. Kolar and O. Michalek, *Chemicky Prumysl*, 36 (March 1961), 162-5.

A comparative study of two methods of hiding power estimation: the Kubelka-Munk method, and the contrast ratio method. The following white pigments were tested: titania white of the rutile and anatase types; zinc white and 30% lithopone. The Kubelka-Munk method is more accurate but at the same time more complicated to carry out; it is thus recommended for research work. The contrast ratio method appears suitable for plant routine practice. The thickness of coats required in the Kubelka-Munk method is much lower (20-80 μ , as compared with 300 μ in the contrast ratio method).

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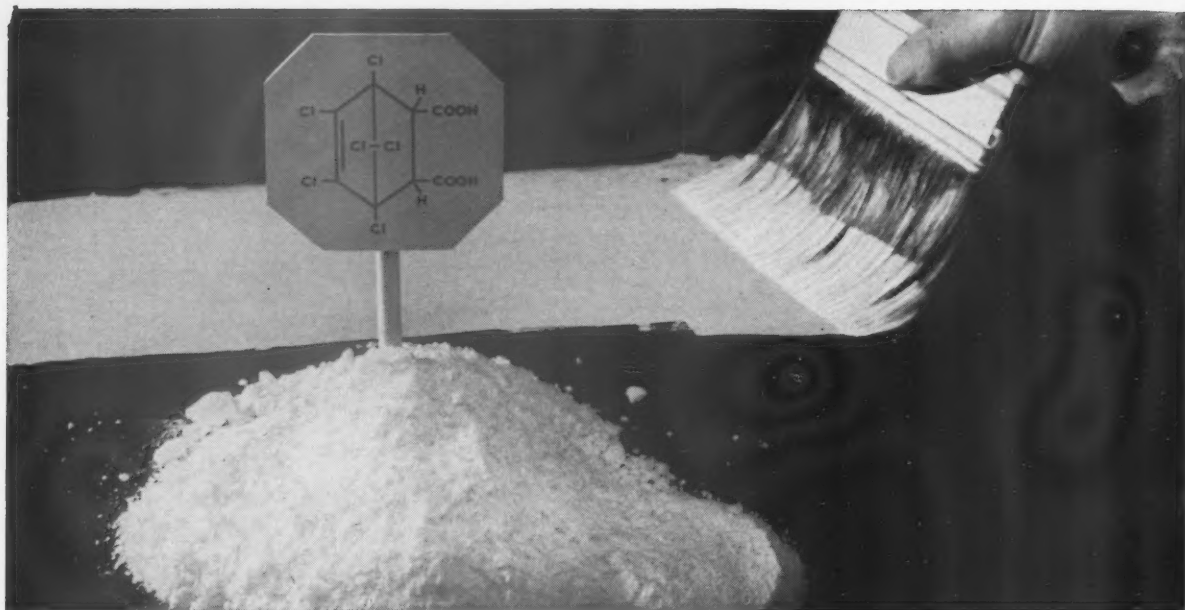
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LARGE SCALE PRODUCTION OF AEROSOL PAINTS

PART I

By

John J. Sciarra*

THE filling of aerosol products can be accomplished through use of specialized equipment. An aerosol filling plant combines the standard filling equipment found in most paint plants with the specialized equipment necessary to pressurize aerosol products. It is for this reason that there have evolved facilities devoted exclusively to the filling of all types of aerosol products.

Custom Filler

These "custom fillers" will generally prepare the concentrate and fill it into aerosol containers or will work from a concentrate supplied by the marketer. In most cases the "custom filler" will also supply the container, valve, label and other components necessary to complete the aerosol package. In this way a marketer of aerosol products can have his product prepared with little, if any capital outlay on his part. It is not the intention of this paper to discuss the pros and cons of "custom filling" and the "setting up your own plant". This has been discussed in great detail from time to time. It should suffice to say that using the services of a custom filler provides the following advantages:

1. No need to invest in equipment of your own.
2. Can use the services of the laboratory maintained by the custom filler for product development.
3. The custom filler generally has a great deal of experience in filling aerosol products.

4. Since he has equipment to fill different types of containers, greater versatility is afforded.

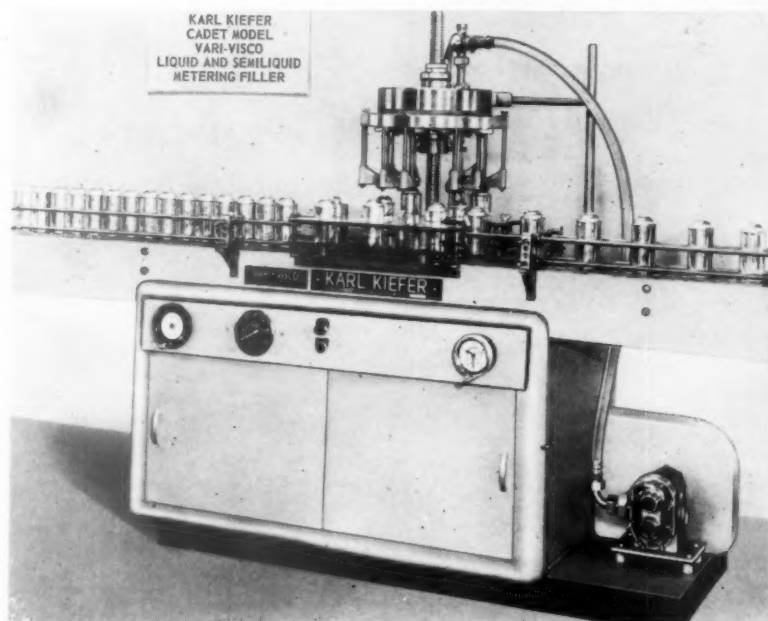
However several disadvantages present themselves:

1. Production schedules and delivery dates are dependent upon the back-log of work which is scheduled by the filler.
2. Shipping costs for product from one warehouse to another.
3. If marketer prepares his own concentrate the shipping costs from one plant to another must be considered.
4. Must run your own control

tests or else insist upon control records maintained by filler.

Many factors must be considered before one can intelligently decide upon which method to utilize. Such things as:

1. Number of containers to be filled per year.
2. What percent of time will plant operate.
3. Type of personnel required to run plant.
4. Length of service required from equipment.
5. Space available, including storage of component parts and finished product, must be considered in the proper



Courtesy of Karl Kiefer

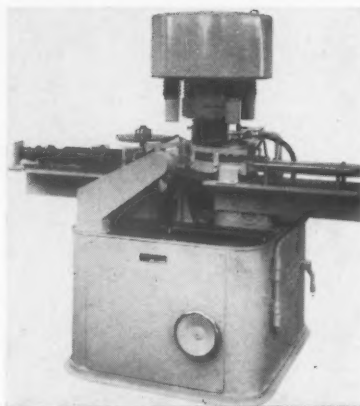
*Associate Professor of Pharmaceutical Chemistry, St. John's University, College of Pharmacy, Jamaica 32, New York.

Liquid and Semi-Liquid Metering Filler

light. Certainly one starting out with a new aerosol product would want to utilize a "custom filler" until such time as his volume increases substantially and he is sure that his product will be successfully marketed for a long period of time. It is at this time that a decision should be made.

Filling Methods

There are two methods used to fill aerosol products. Both these methods cold and pressure filling, are in widespread use. The cold filling method, as the name implies, requires the chilling of all com-



Courtesy of John R. Nalbach Engineering Co.



Automatic Rotary Crimper

ponents, including concentrate and propellant, to well below room temperature while the pressure filling method is carried out at essentially room temperature utilizing pressurized equipment. The type of product and size of container generally influence the method to be used.

The cold filling method, while generally considered to be faster, is restricted to non-aqueous products and those products not adversely affected by low temperatures in the range of -40°F . In this method, product concentrate is chilled to -40°F . and added to the chilled container. The chilled propellant is then added in one or two stages depending upon the amount. Following this a valve is crimped in place. The container then passes through a heated water bath where the contents of the container is heated to 130°F . in order to test for leaks and strength of container. The container is then air dried, cover cap added, and labeled if necessary (containers may be lithographed whereby this step is omitted).

The pressure filling method, when first developed, was generally slower than the cold filling method. However with the development of newer technique, the speed of this method has been greatly increased to make it comparable in rate of production to the cold filling method. In this method, the concentrate is added to the container at room temperature. The valve is then crimped in place and the propellant added through the valve. Since the valve contains extremely small openings (0.018"-0.030") this step usually was slow and held up production. Through development of rotary filling machines and also newer filling heads which allowed propellant to be added around and through the valve stem, the speed was increased. For those products adversely affected by air which may be trapped within the container a vacuum is used to evacuate the air space prior to adding the propellant. Following the addition of the propellant, the method becomes similar to the cold filling method.

For the most part, the pressure filling method is used to fill aerosol paint products. Since some of

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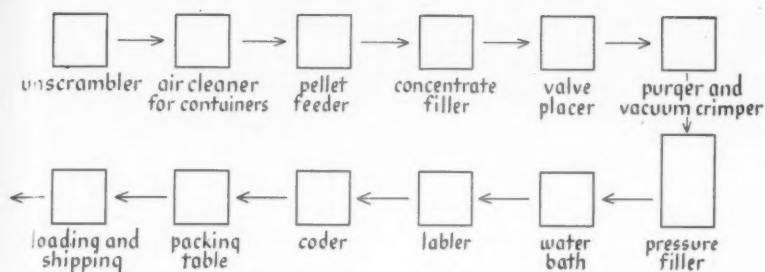
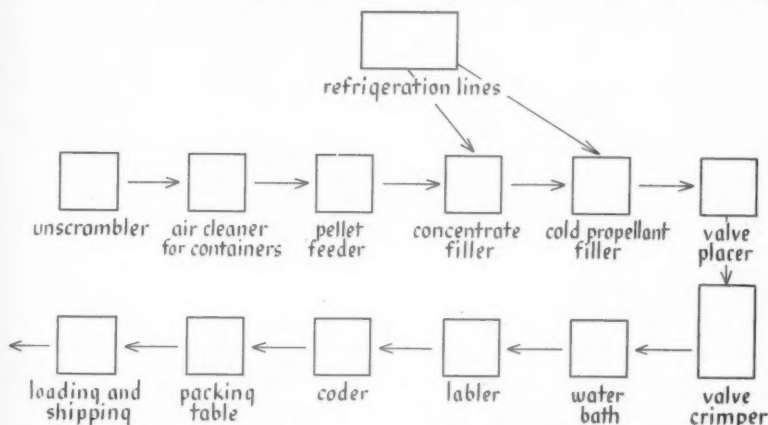


Fig. 1 (above) layout for pressure filling.

Fig. 2 (below) layout for cold filling.



these products are highly pigmented; lowering of the temperature may result in a product too viscous to flow through the filling machines. Some of the water based products cannot be handled by the cold process. However, paint removers and certain acrylic resins for protective coatings can be filled using the cold filling process.

Another factor which will influence the choice of filling method is the type of propellant used. The liquefied fluorinated hydrocarbons and the hydrocarbons can be filled by either method. Filling of hydrocarbons by the cold filling method presents a fire hazard due to their flammability. For this reason, the pressure method is used for hydro-

carbons. The pressure method is also used for compressed gases. For the most part, the fluorinated hydrocarbons are used as propellants for aerosol paints and related products.

Figure 1 shows a suggested plant layout for filling by the pressure method. This can be shifted or changed to suit one's needs and production schedules. Figure 2 shows the same system adapted for the cold filling method.

Components

At this time it is deemed advisable to discuss the component parts in more detail.

Unscrambler—This is a standard unit and is used to feed the aerosol

containers into the filling lines. This consists of a large table with a rotating top.

Air Cleaner—Containers when re-

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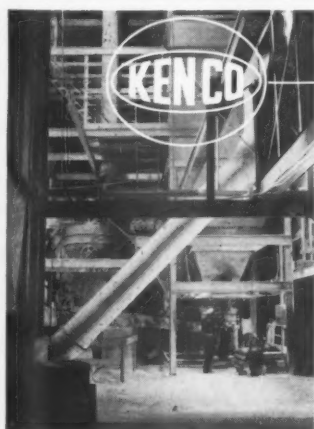
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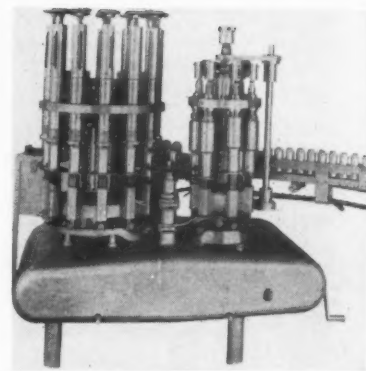


ceived may contain foreign material in the form of lint, packing material, dust, etc. In addition to contaminating the contents, there is present the danger of valve clogging. Most air cleaners operate either on an air or vacuum principle. In one case, air is blown into the cans in the inverted position and blows out the foreign material. In the case of the vacuum type, the vacuum pulls out the foreign material. Since the containers are cleaned before they are shipped to the filler, for paint products, no additional treatment is required.

Pellet Feeder: For aerosol paints,

a pellet, consisting of a stainless steel ball or a marble is added to aid in dispersing the pigment when the container is shaken. This pellet has greatly increased the efficiency of paint products by redispersing any settled pigment.

Product Filler: This can vary from a single stage, single hopper to a large straight line multiple head filler or a rotary type multiple head filler. Production schedules will dictate the type of filler required. Most of these fillers deliver a constant volume of product and they can be set to give a complete fill in one or more operations. Generally only part of the product



Courtesy of Kartridg Pak Co.

Combination Rotary Crimper & Pressure Filler

is added at each stage. This usually gives a more accurate fill.

Valve Placer: The valve can be placed over the container either manually or automatically. High speed equipment utilize the automatic valve placer. This will orient the valve and place it in position prior to the crimping operation.

Crimping Equipment: Most crimpers will serve a dual function, that is, to evacuate the air within the container to about 24" of mercury and then seal the valve in place. Since aerosol paints are packaged in cans and not glass bottles, only one type of crimper is required. These are available either as single head crimpers or as multiple head rotary units capable of vacuum crimping up to 120 cans per minute. These generally require both air pressure (90 to 120 pounds per square inch) and vacuum.

Propellant Pressure Filler: This unit is capable of adding the propellant either through the dip tube or around the outside of the dip tube. These are either single or multiple stage units arranged in a straight line or as a rotary unit. In order to speed production, a compressed gas, such as nitrogen, is used at high pressure to force the liquid propellant into the container.

Leak Test Tank: This consists of a large tank filled with water and containing heating units and a magnetized chain so that the cans are carried through and submerged into the water. The length of the tank is such that the temperature of the product just before it

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emerges from the tank is 130°F.

Blow-off and Drying Unit: This is required in order to remove excess water and prevent rusting of the valve and parts of the container. This generally consists of a stream of air.

Labeler: If lithographed containers are used, this is not required. There are many different types of labelers available and choice would depend upon the type of container used.

Over Cap Placer: This is used to place the over cap or cover cap over the actuator. This can be done manually or automatically depending upon production.

Coder: A coder can be placed either at the beginning or the end of the production line. This is an important piece of equipment since it will identify every can produced.

Packing Table: This is used to accumulate the aerosol cans as they come off the production line.

Other Equipment: Case packers and sealers will be necessary to complete the operation. The boxes would be stacked on pallets which would require the use of a fork lift truck.

The above equipment generally describes the pressure filling method. With a few modifications the line can be used for the cold fill process.

Product Filler: This is refrigerated and must be capable of keeping the concentrate at about -40°F.

Propellant Filler: The propellant filler is on the same order as the product filler except that it is used to deliver propellant at -40°F. The fill is generally controlled by an electro-magnet and can be preset to deliver the desired amount of propellant. In the cold fill process the propellant filler is added before the valve crimper.

Valve Crimper: This is essentially the same unit as the one used in the pressure method except there is no need to draw a vacuum. The time that elapses from the filling to the crimping operation is enough to cause a partial vaporization of propellant which will expel any air from the container.

Other equipment: Refrigeration equipment is necessary for pre-chilling the concentrate and the propellant.

Plasti-Kote Sees 50 Per Cent Sales Rise

A sales rise to \$7,500,000 this year as compared to \$5,000,000 in 1960 and \$3,000,000 in 1959 has been predicted by Elias Shapiro, executive vice president of Plasti-Kote, Inc., Cleveland, Ohio, a leading aerosol paint manufacturer.

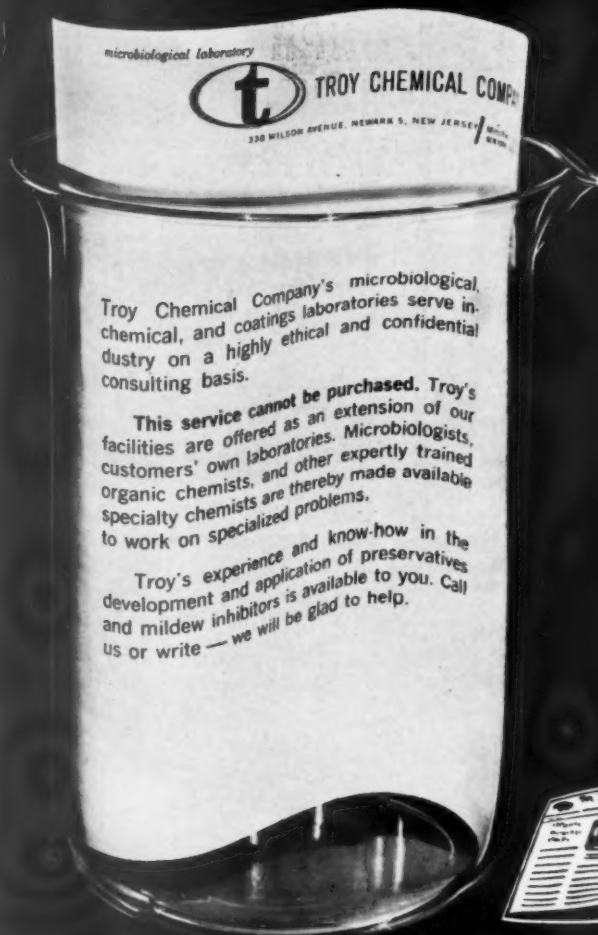
Mr. Shapiro attributes the expected rise in sales to an increased interest in aerosol spray paint. He said that 17 per cent of the general public is aware of the availability of spray paint today, in contrast to an estimated ten per cent a year

ago. "We have only scratched the surface," he added, further estimating that sales will rise more than 100 per cent in the next five years.

Plasti-Kote's sales increased 40 per cent from 1959 to 1960, while national sales in the industry as a whole were up 25 per cent, according to industry figures.

Plasti-Kote, Inc., plans to move into a new 105,000 sq. foot plant in Medina, Ohio, late this summer. The new plant, which will have a 20 million aerosol paint can capacity, will be the most modern plant of its kind in the world.

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Aerosol

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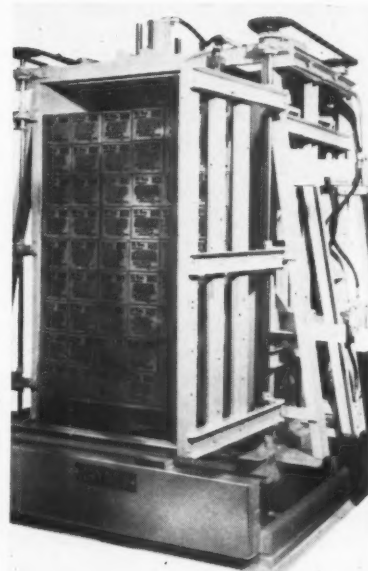
The tenth annual aerosol package contest will be held in conjunction with the 48th annual meeting of the Chemical Specialties Manufacturers Association in the Roosevelt Hotel, N. Y., December 4-6.

The judging and selecting of the

best aerosol packages of the year will be made on the basis of general sales appeal of the complete package. The awards will be made on the basis of package design only. Names of contest judges, specialists in the field of package design, will be announced at a later date.

One of the 15 categories to be

judged is "paints, enamels, other protective coatings and paint remover."



GAYNES

Pallet-Shaker Handles 2400-Can Load

Gaynes Engineering Co. has developed a completely automatic pallet-shaker which will shake over 2400 aerosol cans, already cased, in one operation.

A complete pallet load is installed by a fork lift operator who, with the push of a single button, actuates a complete cycle that initiates side and top pressure and front gate closing to lock the load. The drive motor starts the shaking operation for a predetermined length of time. When the sequence has been completed, the unit releases the load, ready for removal.

Wrinkle Finish Goes Aerosol

The Illinois Bronze Powder Co. has developed a new wrinkle finish that can be applied from an aerosol can. The finish, titled Wrinkle Finish Spray-O-Namel, gives the same type of wrinkle texturing to metal, glass, plaster and wood that was previously possible only with baking or using expensive equipment. The finish can be felt as well as seen. It can be used on prepared wood surfaces to give the appearance of metal.

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NEWS

NEWS OF COMPANIES, ASSOCIATIONS
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ITEMS OF GENERAL INTEREST

U. of California Conference to Discuss High Polymer Coatings

The Engineering Extension at the University of California, in cooperation with the Los Angeles Society of Coatings Technology, will conduct a two-day conference on new product development in the field of high polymer coatings, Sept. 12-15 on the UCLA campus.

The purpose of the conference is to present a broad program involving the present and future uses of high polymers in major industries. It is intended for research and development engineers and chemists, industrial engineers, technical supervisors, plant managers and architects. Session chairman will be Russell B. Green of the Monsanto Chemical Co., and the opening address will be made by H. C. McClellan, president, Old Colony Paint Co., Los Angeles.

Tenneco Plant Goes On Stream

Tenneco Oil Co. has placed on stream its new aromatics production facilities at Chalmette, La. Completion of the unit marks the Co.'s entry into the petro-chemical field. Currently being produced are: benzene, ethylbenzene, orthoxylene, mixed xylenes, toluene and heavy aromatic solvents.

The new facilities include a 6,000-barrel-per-day catalytic reformer, a 2,200-barrel-per-day extraction plant, and fractionation units capable of producing annually 22-million pounds of orthoxylene and 20-million pounds of ethylbenzene.



Showing satisfaction with test panels of a new flushed permanent yellow pigment, "X-48 Permanent Yellow, Lead Free," for use by the protective coatings industry, are Nelson S. Knaggs (left), Vice-President in Charge of Sales, The Hilton-Davis Chemical Co., and J. A. Langner, Mgr. of sales.

Shawinigan To Construct New Office Building

Shawinigan Resins Corp. will construct a \$1½-million office building at its headquarters in Springfield, Mass. Scheduled for completion in mid-1962, the new two-story office building will house Shawinigan's executive offices and several staff departments.

The new building will consist of 18,000 sq. feet on two floors and a basement and will accommodate about 60 persons.

Artist's sketch of new Shawinigan office building.



FTC Mary Carter Hearing Ends; Examiner's Decision In 90 Days

FTC hearings on charges that the Mary Carter Paint Company has been making deceptive "free" claims to promote its products were concluded last Wednesday, August 2, in New York. Examiner Herman Tocker presided at the continued hearing which started Monday, July 31. Examiner Tocker stated that under new FTC regulations, his decision has to be made within 90 days.

Earlier hearings on May 3, 1961, were devoted mainly to the FTC's case. On July 31, the FTC concluded. At the end of the Government's case, Examiner Tocker refused to grant motions to dismiss the complaint, made by Mary Carter Counsel.

When the attempt was made to introduce evidence concerning the quality of Mary Carter paint, activities of the National Paint, Varnish and Lacquer Association and Better Business Bureaus, and results of comparative quality tests between Mary Carter paints and the products of nationally known manufacturers, Examiner Tocker excluded such testimony from the record on the ground that it was not relevant to the issue, which he said concerned only whether advertising practices of the respondent were deceptive as stated in the complaint. When Mary Carter counsel declared that this was the bulk of the defense and took exception to this ruling of Examiner Tocker, the latter permitted the testimony to be transcribed for purposes of review by the Federal Trade Commission, if his decision as an examiner was later contested.

Hodag Completes New Facilities

Hodag Chemical Corp., has announced the completion of a new two-level building and installation of new automatic equipment which will double the firm's production of surface active chemicals.

The equipment includes a 100-gallon, electrically heated reactor with an automatic control system designed by Hodag engineers. The building which houses this equipment is also designed to accommodate additional processing systems in the future.

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Machine Grades)

NEWS

Oronite Relocates Sales Office

The Oronite Division of California Chemical, a subsidiary of Standard Oil of California, has moved its Chicago sales office to a new location at 101 South Washington Ave., Park Ridge, Ill. The former address was 20 North Wacker Dr., Chicago.

The expanded sales office, which opened Aug. 1st, is located in a new industrial park section near O'Hare Int'l. Airport. Oronite's three marketing groups—industrial chemicals, surface coatings and plastics chemicals, and petroleum chemicals—will be located in the new office. In addition, the office will serve as Midwestern area supply and distribution center for Oronite products.

National Starch & Chemical To Build Monomer Plant

National Starch and Chemical Corp. recently announced plans to build a \$4-million vinyl acetate monomer plant. The annual capacity of the new plant will be 45-million pounds.

One of two sites currently under study in Texas will be selected for the location of the plant. Construction is scheduled to begin late this year and the new facility is expected to be in operation during the fall of 1962.

Acme Leases Office and Warehouse Space

Acme Shellac Products Co., has leased space on Blanchard St., Newark, N. J., to accommodate expansion of sales and administrative offices and warehouse facilities. 20,000 sq. feet for warehousing is expected to care for requirements in the near future. The entire building is being enlarged and renovated.

Present offices will be converted to more spacious control and research laboratories. This will quadruple present laboratory space and provide ample facilities for pilot-scale equipment.

The new quarters are expected to be occupied about Aug. 15th.

Sparkler Awarded Medal In Germany

Sparkler Mfg. Co.'s Holland Division was awarded a bronze medal and a citation at the recent German International Exposition of Chemical and Laboratory Equipment. The citation reads: "In recognition of achievement in the field of Chemical equipment, the firm of Sparkler International, Ltd., Amsterdam, Holland, in the year of the 41st celebration of the founding of the ACHEMA Exhibition-Convention has been presented with the ACHEMA Commemoration Medal in bronze."

ACHEMA is the abbreviation of the German words meaning German Association of Chemical Equipment Manufacturers, in English. The Association is the group that sponsors the annual exhibition.



Holland Division Representative accepts ACHEMA award on behalf of Sparkler Int'l.

Berkshire Chemicals Announces Distributorship

Berkshire Chemicals, Inc., has announced that it has become eastern distributor for Desert Minerals, Inc., a firm which produces talcs under the trade mark "Desertalc". The products are hydrous magnesium silicates of grades tailored to specific applications throughout industry. Berkshire will inventory and distribute all grades of Desertalc from local warehousing points in Chicago, Cleveland, Boston, New York and Philadelphia, as well as solicit direct carload business from California to potential consumers in their sales territory.



Constituent Society Meetings

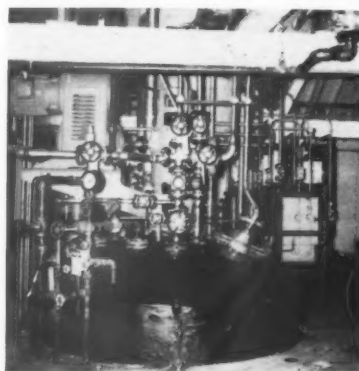
- Baltimore**, 2nd Friday, Marty's Park Plaza Hotel.
- Chicago**, 1st Monday, Furniture Mart.
- C.D.I.C.**, 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Dick Perfidio's Wishing Well.
Dayton — Nov., Feb., April, Hotel Gibbons.
Columbus — Jan., June, Sept., Everglades.
- Cleveland**, 3rd Friday, Cleveland Engineering & Scientific Center.
- Dallas**, 1st Thursday after 2nd Tuesday, Lucas B & B.
- Detroit**, 4th Tuesday, Rackham Building.
- Golden Gate**, Monday before 3rd Wednesday, Sabella's Restaurant, San Francisco.
- Houston**, Monday prior to 2nd Tuesday, Rams Club.
- Kansas City**, 2nd Thursday, Pickwick Hotel.
- Los Angeles**, 2nd Wednesday, Montebello Country Club.
- Louisville**, 3rd Wednesday, Sheraton Hotel.
- Montreal**, 1st Wednesday, Queen's Hotel.
- New England**, 3rd Thursday, University Club, Boston.
- New York**, 1st Thursday, Brass Rail, 100 Park Ave.
- Northwestern**, 1st Friday, St. Paul Town and Country Club.
- Pacific Northwest**, 3rd Thursday, Washington Athletic Club, Seattle, Wash.
- Philadelphia**, 2nd Thursday, Philadelphia Rifle Club.
- Piedmont**, 3rd Wednesday, Rainbow Supper Club, High Point, N. C.
- Pittsburgh**, 1st Monday, Gateway Plaza, Bldg. 2.
- Rocky Mountain**, 2nd Monday, Republican Club, Denver, Colo.
- St. Louis**, 3rd Tuesday, Rugger's.
- Southern**, Annual Meetings Only.
- Toronto**, 3rd Monday, Oak Room, Union Station.
- Western New York**, 1st Monday, 40-8 Club, Buffalo.

NEWS

North American to Store and Ship Eastman Alcohol

Eastman Chemical Products, Inc., subsidiary of Eastman Kodak, has just concluded an agreement with the Terminal Services Division of the North American Car Corp. to store and ship certain grades of ethyl alcohol at North American's Sag Junction terminal in Lemont, Ill. First Eastman alcohol to be handled by North American will be SDA-40 (anhydrous) and SDA-3A (95%). Bulk shipments will be made from this terminal to users in the Chicago area.

Less than two years ago Eastman added Carteret, N. J., to its list of distribution points for ethyl alcohol. Tecsol, an Eastman proprietary solvent, and most types of 95% and anhydrous denatured alcohol are being shipped out of Carteret to points in New England and in the Middle Atlantic states.



New stainless steel kettle installed by Verona Chemical to make Roskydal Polyester Resins

Naftone to Manufacture Roskydal Polyester Resins

Arrangements have been completed for the manufacture of Roskydal Polyester Resins in this country, according to Naftone, Inc. This is expected to result in economies sufficient to allow a sharp decrease in price. Formerly imported, Roskydal Resins will be manufactured at the newly completed Newark, N. J. plant of the Verona Chemical Corp., exclusively for Naftone.



CALENDAR

Sept. 11-15. Fall Instrument-Automation Conference and Exhibit and 16th Annual Meeting, Instrument Society of America, Memorial Sports Arena, Los Angeles, Calif.

Sept. 17-20. 49th Annual Convention of Canadian Paint, Varnish & Lacquer Assn., Park Plaza Hotel, Toronto, Canada.

Sept. 21-23. Third symposium of Cleveland Society. Subject: "Degradation of Paint Films After Application." Cleveland Engineering and Scientific Center, Cleveland, Ohio.

Oct. 18-20. 23rd Annual National Packaging Forum of the Packaging Institute, Biltmore Hotel, New York City.

Oct. 30-Nov. 1. Seventy-fourth Annual Meeting of the National Paint, Varnish and Lacquer Assn. Statler-Hilton Hotel, Washington, D. C.

Oct. 30-Nov. 1. Fall Meeting of the American Oil Chemists Society, Pick-Congress Hotel, Chicago, Ill.

Oct. 30-Nov. 1. 4th Annual Meeting and Conference of the Canadian Mfrs. Specialties Assn., Royal York Hotel, Toronto, Canada.

Oct. 31-Nov. 4. 26th Paint Industries' Show, Shoreham Hotel, Washington, D. C.

Nov. 2-4. Annual Convention of the Federation of Societies for Paint Technology. The Shoreham and Sheraton-Park Hotels, Washington, D. C.

November 26-28. Fourteenth Annual Convention and Trade Show of the Retail Paint & Wallpaper Distributors of America at Cobo Hall, Detroit, Mich.

December 4-6. Chemical Specialties Mfrs. Assn., 48th Annual Meeting, New York City.

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PERSONNEL CHANGES

SPENCER KELLOGG

Fred A. Bristol, Jr., has been promoted and transferred to the position of Special Products Sales Manager. He will be located in the administrative offices at Buffalo, N.Y. **Hans M. Hauge** will succeed Mr. Bristol in New York City as Technical Service Representative.



F. A.
Bristol



D. K.
Farstad

Dan K. Farstad has been appointed to the position of Director of Technical Sales and Services. He will move his headquarters to the main office of the Co.

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FMC

Carl E. Barnes has joined the firm as vice president for research. Dr. Barnes' primary responsibility will be direction of the research, development and patent activities of FMC's chemical divisions. He will make his headquarters at the division's administrative offices in New York City.



C. E.
Barnes



R. B.
Newman

VULCAN-ASSOCIATED

Robert B. Newman has been named Vice President—Director of Sales of Vulcan Containers' Bellwood branch.

BUNKER HILL

Ken L. Tourtellot has been appointed Northwest District Manager for the Pacific Division. He will supervise all sales activities in Washington, Oregon and northern Idaho. He will make his office at the Co.'s Pacific Division headquarters in Seattle.

SHAWINIGAN

Irving Ash and **Bruce E. Porter** have been appointed to the newly-created post of district manager. The two men will now be responsible for the activities of the sales staff in considerably enlarged territories. Ash is located in New Jersey and Porter in Cleveland, Ohio.

PITTSBURGH PLATE GLASS

Thomas A. Smith has been appointed assistant manager at the Milwaukee paint plant.

Franklin J. Hoffman has been named factory manager at Portland.

Francis J. Splinter has been appointed plant superintendent of trade sales production at the Milwaukee paint factory.

ALLIED CHEMICAL

William P. Leary has been named manager of sales—special chemicals, a newly created position.

ARCHER-DANIELS-MIDLAND

Everett Sklarz of N. Y. has been appointed eastern regional sales manager. He will be in charge of all administrative and sales matters for all products in the area covered by the Co.'s N. Y. regional office.

NEVILLE CHEMICAL

Dr. Allan F. Kingsley has been appointed to the Co.'s technical division where he will be in charge of analytical activities.

J. M. HUBER

Joachim H. Becker has joined the Chemicals Division of J. M. Huber Corp. in the newly created position of Engineering Development Manager. His headquarters will be at Havre de Grace, Md.

REARDON

Edward R. Heck has been appointed National Sales Director. He comes to Reardon from California where he was Director of Marketing for new products for Lok Mfg. Co.

AMERICAN CAN

Gerald G. Hoover has been appointed manager of the Tin Plate Division of American Can's Cancro Division, Purchases and Traffic Dept.

Edward A. Waynes has been appointed assistant manager of the Tin Plate Division.

DAVID LITTER

Allen Feinsilver has recently joined the firm as a Senior Chemist. Mr. Feinsilver will supervise a newly formed group specializing in the formulation and evaluation of new raw materials in Industrial Product finishes of all types, particularly of the new varieties of both the solvent and water thinned types.



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